A

SYNOPSIS

OF THE GENUS

ARTHONIA.

BY

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PREFACE.

The genus ARTHONIA (the name said by the author to be derived from the Greek *Artho*, (aspergo) to sprinkle, "propter thallum apotheciis minutis quasi adspersum," was established by Acharius in Schrader's *Neuer Journal f. d. Bot.* 1806, accompanied by a table representing tolerably well, according to Krempelhuber, four species and one variety; but as Fée observes, (*Ess. p. xxxi*) the Greek word equivalent to aspergo is *ardo*, and the proper spelling of the name would have been *Ardonia*. The species as interpreted by him were described in his *Lichenographia Universalis* and *Synopsis Lichenum*, the genus being thus defined: "Receptaculum universale [thallus], crustaceum plano-expansum adnatum uniforme. Partiale [apothecia] innato-sessile subtrotundo-difforme immarginatum (atrum) membrana subcartilaginea tectum, parenchymate solido similari." Some of his Arthonias, however, do not belong to the genus, while other lichens now comprised in it, including the pale-fruited species, were referred to other genera, especially *Graphis* and *Opegrapha*. Fries, in his *Lichenographia Europæa reformata*, did not accept the genus, but described several species belonging to it under *Coniocarpon* and *Coniangium*. The spore characters were first indicated by Eschweiler as follows: "Asci [thekes] ovato-pyriformes, thecas [spores] foventes 3 vel 5 subcylindricas annulatas, annulis 1–15." (*Syst. p.* 17, *and f.* 20.) Fée did not have a clear conception of the genus, regarding it in the Suppl. as an empirical one, and his figures of spores referred to *Arthonia* are mostly, if not all, those of species of *Graphis*, as are many of his *Arthonias;* but he retains *Coniocarpon* DC. for Arthonias with colored fruit, (equivalent to *Spiloma* Ach.) Succeeding writers of the ante-microscopic period followed Acharius. The genus, as here understood, was definitely established by Nylander in his *Synopsis Arthoniarum*, 1856, who has been followed by most subsequent writers, though some retain *Arthothelium* Mass. for the species with muriform spores, and *Coniangium* Fr. for those with 2 locular spores. The genus is defined by Tuckerman, *Genera*, *p.* 217, as follows: "Apothecia rotundata oblongave, margine accessorio thallode nunc instructa, proprio destituta, plus minus aggregata l. dein in pseudostroma difforme l. rotundatum l. stellatum confluentia. Sporæ (in thecis plerumque abbreviatis pyriformibus) oblongo-ovoideæ, (nymphæformes) l. oblongæ l. rarissime fusiformes, 2–4–pluriloculares, demum et muriformi-multiloculares, fuscescentes l. decolores. Spermatia oblonga l. bacillaria, l. acicularia; sterigmatibus simplicibus. Thallus crus-

taceus, uniformis, aut hypophlæodes." For a full account of the synonymy of the genus, and for fuller historical observations, reference may be had to the works of Tuckerman, Nylander and Almquist, to Koerber's *Systema* and *Parerga*, Th. M. Fries's *Genera Heterolichenum*, and Stitzenberger's *Beitrage*.

In Nylander's definition of the genus the thalamium is said to be "paraphysibus discretis nullis." There are however a few species, especially the lecideoid ones, which present the appearance of regular paraphyses; and I have observed such even in *A. radiata* and in *A. glaucescens*. But in most cases the thalamium is pervaded by a confused tissue not differing, perhaps, from the hyphæ of the hypophlæoid thallus, as may be seen in *A. punctiformis*. The thallus, especially when well developed, often takes a deep blue color with iodine, and this may also be seen in the hypophlæoid hyphæ, after previous treatment with dilute sulphuric acid. The gonidia are mostly the concatenate ones of the Graphideæ (*chroolepogonidia* Nyl.); but in a number of species are the ordinary green gonidia (*haplogonidia* Nyl.); for the latter Nyl. has proposed the distinctive name *Allarthonia*. According to Almquist, p. 7, both forms sometimes occur in the same species.

The species of Arthonia have been largely increased by collectors in various parts of the world in recent times, among whom are specially to be mentioned Lindig for South America and Charles Wright for Cuba. The collections of the former have been determined by Nylander. The Cuban Graphideæ have been distributed. Among them are many new Arthonias, some of which have been named by Nylander, but they are as yet undescribed. The descrip tions I have attempted of some of them, being founded mostly on small specimens, must be regarded as imperfect; and I have not ventured to name these species, to which names have perhaps already been given by Dr. Müller, who has rendered an important service by the revision of the Lichens of Eschweiler and Fée.

The synonymy of the European Arthonias is often conflicting, owing doubtless to some extent to the confusion of species in the early herbaria. The difference of opinion in regard to what shall constitute a species is great. These matters I do not undertake to decide.

A list of the authorities consulted will be found succeeding this preface. I had the privilege several years ago of examining the Arthonias of the late Professor Tuckerman's herbarium, which, however, had not been thoroughly worked up by him. But I have not had the opportunity of consulting them again for the purposes of this work.

The following pages are intended rather as a record than as a critical revision and arrangement of the genus, which can only be attempted by one having access to the riches of the European herbaria,

and a better opportunity of examining the recent species than I have enjoyed. This might probably result in the reduction of some of the species herein mentioned. But a large accession may also be anticipated as the lichens of the world become better known. But little has as yet been done for the Arthonias of North America, and many additions may be expected to them, especially in the Southern and Western regions.

The object of this publication will have been fully attained if it shall aid some more competent hand in making a complete and much to be desired study and elaboration of this difficult genus. To such I appeal for a lenient judgment of the errors and deficiencies which may be found in a perhaps presumptuous undertaking.

The following arrangement is of course artificial, being designed to give some aid in the examination of species. Some might with equal propriety be referred to the series with colored, or to that with black apothecia. The color of the spores is mentioned only when they are brown, although typically all the Arthonia spores belong to the colored series. It has not been attempted to give all the synonyms of the older writers, and in general only the more recent exsiccati known to the writer have been referred to. The spores of *Arthonia* are mostly 8 or 6–8 : in a very few species 1–2. No Arthonias with polysporous thekes are known. As to the manner of development of the Spore, see *Minks*, *Symbolæ*, *p. xii*.

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EXSICCATI.

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NORRLIN & NYLANDER. Herbar. Lich. Fenniæ, n. 1–450.
TUCKERMAN herbarium.
WILLEY herbarium.
WRIGHT Lichens Cubani.

SCHEME OF THE ARRANGEMENT.

Series **A.** Apothecia variously colored, not black.

* Spores 2 rarely 3 locular.
- † Apoth. lighter colored. Species 1–6.
- † Apoth. darker colored. Species 7–20.

** Spores 4-plurilocular.
- † Apoth. whitish or pale yellow. Species 21–40.
- †† Apoth. crimson, or violet brown, or purple. Species 41–47.
- ††† Apoth. yellow, or cinnamon colored, or brown or reddish-brown, often blackening. Species 48–120.

*** Spores muriform.
- † Apoth. pale. Species 121–129.
- †† Apoth. yellow. Species 130–131.
- ††† Apoth. crimson, or red, or purple. Species 132–135.
- †††† Apoth. brown, and now blackening. Species 136–143.

Series **B.** Apothecia black.

* Spores 2 rarely 3 locular.
- † Apoth. rounded, more or less lecideiform.
  - *a* Thallus glebous-squamose. Species 144.
  - *b* Thallus uniform.
    - ‡ Growing on rocks, earth, or decayed vegetation. Species 145–153.
    - ‡‡ Growing on bark, dead wood, or leaves. Species 154–179.
- †† Apoth. from rounded, more or less elongated or stellate, or irregular. Species 180–197.
- ††† Parasitic species, spores 2 locular. Species 198–214.

** Spores 4–8 locular.
- † Apoth. rounded, or oblong, or angular.
  - ‡ Growing on rocks. Species 215–219.
  - ‡‡ Growing on bark or dead wood. Species 220–260.
- †† Apoth. becoming linear or stellate. Species 261–295.

*** Spores 8-plurilocular. Species 296–303.

**** Parasitic species, the spores 4-locular. Species 304–306.

***** Spores muriform. Species 307–348.

SERIES **A.** Apothecia variously colored, not black.

* Spores 2, rarely 3 locular.

† Apoth. lighter colored.

1. **A. carneornfa,** Willey. Thallus very thin, white, effuse. Apoth. reddish flesh-colored, numerous, small, rounded, convex. Spores ovoid, 2 locular, .008–10 by .004–5 mm. Reaction with iodine blue.—*Suppl. p.* 52.—On dead wood, Washington Territory. Suksdorf, 1884.

2. **A. incarnata,** (Th. Fr.) Kullh. Thallus inconspicuous. Apoth. reddish, darkening with age, numerous, rounded, convex, now confluent, within pale. Spores solæform, 3 locular, .012–17 by 005–7 mm., the upper cell larger. Reaction vinous red.—*Almq. p.* 18.—On dead wood and Abies, Scandinavia, and on the same substrates, White Mts. in hb. Willey.

3. **A. helvola,** Nyl. Thallus thin, greenish or fuscescent. Apoth. from yellowish becoming brownish red, minute, rounded, convex, now confluent. Spores solæform, 2–3 locular, .008–12 by .004–5 mm. Reaction vinous red; with potash deep violet.—*Flora* 1867, *p.* 330. *Almq. p.* 17. *A. lurida v. helvola Nyl. Arth., p.* 92, *Pr. Gall., p.* 165. *Exs. Lojka L. U., n.* 194, *Norrl., n.* 224. —On bark and dead wood, Europe. Not unlikely to be found in this country.

4. **A. alborufella,** Nyl. Thallus thin, white. Apoth. red, very minute, rounded, innate, somewhat aggregated. Spores ovoid, 3 locular, .014–16 by .006–7 mm. Reaction blue, then vinous red.—*Pr. N. Gr., p.* 101.—Cuba. Wright exs., n. 188.

5. **A. cinnabarinula,** Müll. Arg. Thallus thin, greenish. Apoth. crimson, stellate-ramose, plane, the 2–5 branches obtuse. Spores ovoid, 2 locular, .006–8 by .002–25 mm.—*Beitr., n.* 307.—On leaves, Brazil.

6. **A. pulcherrima,** Müll. Arg. Thallus thin, white, powdery. Apoth. crimson, rounded, angulate or sublobate, plane, thin. Spores ovoid, 2 locular, .008–10 by .004 mm.—*Beitr., n.* 1053. Portorico, West Indies.

†† Apoth. darker colored.

7. **A. lurida,** Ach. Thallus inconspicuous. Apoth. brown or blackening, within of the same color, rounded or somewhat difform, appressed, plane or slightly convex. Spores ovoid, 2 locular, brown or decolorate, .010–12 by .005 mm. Reaction with iodine vinous red, with potash deep violet. Spermatia oblong, .004–6 mm. long. —*L. U., p.* 143, *Syn., p.* 7. *Schær. En., p.* 212, *and t.* 9. *f.* 6. *Nyl. Arth., p.* 91. *A. lurida, c. vulgaris Almq., p.* 16. *A. vinosa Leight. Gr. Brit., p.* 391, *p. p. fide Almq. l. c. Coniangium Kbr. Syst., p.* 298. *C. vulgare, Fr. L. E., p.* 378. *A. sublurida Anz. Neosymb., p.* 13, *fide Almq. l. c. Lecidea emphysa Stirt., Grevillea* 1874, *p.* 33, *fide seipso, ibid. Nov.* 1874. *But see Leighton's remarks ibid. p.* 117, *and Stirton's reply ibid.* 1875, *p.* 173. *Exs. Norrl., n.* 223.—Europe. New England in hb. Willey. Buffalo, N. Y., Miss Wilson.

Var. spadicea, Nyl. Apoth. darker, and the spores smaller, .007 –9 by .003–4 mm.; figured in Hepp, n. 161.—*Arth. p.* 92, *Pr. Gall., p.* 411. *Almq., p.* 15. *A. spadicea Leight. Gr. Brit., p.* 393.—Europe.

8. **A. luridofusca,** Nyl. Similar to *lurida v. spadicea*, but without reaction with potash. Spores .014–17 by 005–6 mm.— *Flora* 1875, *p.* 363. *A. lurida var. Almq., p.* 15. *Exs. Zw., n.* 86 *D. Lojka L. U., n.* 193.—Europe.

9. **A. subspadicea,** Nyl. Similar to *A. spadicea*, but colorless within, and giving no reaction with potash. Spores .010–11 by .0035–45 mm.—*Flora* 1875, *p.* 364.—Europe.

10. **A. didyma,** Kbr. Thallus thin, effuse, leprous, from glaucescent becoming reddish. Apoth. dark brown and blackening, minute, crowded, difform, angulose, or substellate, plane, or slightly convex. Spores ovoid, 2 locular, brown or decolorate. .016–18 by .0065–8 mm., the upper cell larger; figured in Hepp., n. 558. Reaction from blue vinous red.—*Sert. Sud., n.* 8. *Almq., p.* 13. *Nyl. Scand., p.* 261. *A. pineti Kbr. Syst., p.* 292, *Pg., p.* 266. *A. lurida v. pineti Nyl. Scand., p.* 261, *Lapp. Or., p.* 167. *A. vinosa v. pineti, Leight. Gr. Brit., p.* 392.—Europe; and a too scanty specimen from the White Mts. may belong here.

Var. decipiens, Kbr. Thallus leprous, white. Apoth. rounded, tumid, more emergent.—*Pg. p.* 266.—Europe.

11. **A. atrofuscella,** Nyl. Similar to the preceding, but the spores smaller, .012–16 by .005–6 mm.—*Flora* 1875, *p.* 363.—Europe.

12. **A. sapineti,** Nyl. Similar to *atrofuscella*, but the apoth. pale within and no reaction with potash. Spores .011–14 by .006 mm.—*Flora* 1876, *p.* 239. *A. didyma, Almq. p.* 13.—Europe.

13. **A. punctilliformis,** Leight. Thallus filmy. Apoth. blackish-brown, excessively minute, irregularly roundish, convex, scattered, within brown. Spores oblong-ovoid, 2 locular, pale brown, .029 by .0135 mm.—*Trans. Linn. Soc., Vol. I, Ser.* 2, *p.* 146, *and t.* 22, *f.* 26–28.—On holly, Wales.

14. **A. Floridana,** Willey. Thallus inconspicuous, bordered by a thin dark line. Apoth. dark brown and blackening, rounded, oblong, or now sublobate, slightly convex. Spores fusiform-ovoid, 2 locular, .016–22 by .006–8 mm. Reaction vinous red.—*Suppl. p.* 52.—Florida in hb. Calkins.

15. **A. Austinii,** n. sp. Thallus, thin, white. Apoth. blackening, stellate and difform. "Sp. parvæ, tenues, incol., 2 loc., .010 by .003 mm." Reaction blue.—Florida, Austin in hb. Tuck. I have seen only a small bit, and have not detected spores, and mention it here only for further inquiry. Sent to Nyl. under n. 92. ≈ *n.* 183

16. **A. conspicua,** Nyl. Thallus inconspicuous, brown and blackening, rounded-oblong or obsoletely lobate, convex, within dark. Spores ovoid, 2 locular, brown, .029–33 by .012–15 mm. Reaction vinous red.—*Pr. N. Gr. p.* 101. *Myriangium inconspicuum Bab. N. Zeal., p.* 16 *and t.* 128.—On dead leaves, New Zealand.

17. **A. ephelodes,** Nyl. Thallus thin, white, determinate. Apoth. brown or ochraceous-brown, macular-difform, large, adnate. Spores commonly 3 locular, .014–15 by .006–7 mm. Reaction blue. —*Syn. N. Caled., p.* 60.—New Caledonia.

18. **A. Henoniana,** Müll. Arg. Thallus inconspicuous. Apoth. black when dry, becoming brown when wet, suborbicular, obsoletely lobate or angulose, plane, within pale or olivaceous. Spores solæform, 2, more often 3 locular, the upper cell larger, .020–23 by .007–9 mm.—*Flora* 1879, *p.* 387.—Japan.

19. **A. delicatula,** Müll. Arg. Thallus thin, white. Apoth. olive-brown, paler when wet, innate, orbicular or irregularly angulose, pruinose, at length naked, simple or 1–2 branched, convex, within dark. Spores oblong-ovoid, 3 locular, .018–21 by .006–8 mm.— *Beitr. n.* 523. *Shirley,* 1889, *p.* 150.—Australia.

20. **A. scitula,** Kph. Thallus thin, white, dilated, bordered by a thin dark line. Apoth. numerous, brown, minute, stellate or dendritic-ramose. Spores solæform, 3 locular, .023 by .011 mm.— *Flora* 1876. *p.* 481.—Brazil.

To this stock may also belong *A.* (*Coniangium*) *glaucofuscum,* Kbr., *L. S. G., n.* 319, and *A.* (*Coniangium*) *paradoxum,* Kbr., *Verh. Bot. Soc. in Wien,* 1868, *p.* 705.

** Spores 4-plurilocular.

†Apoth. whitish or pale yellow.

21. **A. Antillarum,** (Fée) Nyl. Thallus thin, white, determinate. Apoth. pale, macular-difform. Spores ovoid-oblong. 4 locular, .013–16 by .0045–55 mm. Reaction blue.—*Coniocarpon, Fée, Supp., p.* 94 *and t.* 42 *f.* 4. *Mont. Cub. p.* 169. *Arthonia, Nyl. Syn. N. Cald. p.* 61. *Mull. Arg. Graph. Fée, p.* 50. *A. hepatica Mey. and Flot. Act. Leop. vol.* 19, *p.* 230, *fide Mull. Arg. Revis. Mey., p.* 318. *Exs. Wright Cub., n.* 125 *b.* Spermatia in a Calcutta specimen from hb. Krempelhuber. oblong, minute.—Tropical, widely distributed.

22. **A. Cinchonæ,** Müll. Arg. Thallus white, thickish, mealy, continuous. Apoth. flesh-colored, linear, variously branched, somewhat flexuous, slender, innate. Hypothecium thick, pale yellow. Spores ovoid-fusiform, 4 locular, .015–17 by .005–6 mm. *Graph. Fée, p.* 54.—Tropical in hb. Fée.

23. **A. perpallens,** Nyl. Thallus white, subdeterminate. Apoth. pale or pale yellowish, rounded or difform, plane. Spores oblong-ovoid, 4 locular, .012–14 by .0045–5 mm. Reaction vinous red.—*Pr. N. Gr., p.* 100.—Bonin Islands, Japan.

24. **A. impallens,** Nyl. Thallus thin, white. Apoth. pale or pale yellow, numerous, linear, flexuous, more or less branched. Spores ovoid-oblong, 2–4 locular, .011–12 by .0035 mm. Reaction of the hymenium blue, of the thekes dark vinous red.—*Flora* 1885, *p.* 448.—On holly, New Jersey, in hb. Eckfeldt.

25. **A. ochrolutea,** Nyl. Thallus thin, white, determinate. Apoth. pale yellow, numerous, rounded, oblong or angulate, plane, margined by the thallus, (in Florida specimens parallelly disposed.) Spores oblong-ovoid, 4 locular, .011–16 by .003–4 mm. Reaction blue.—*Flora* 1886, *p.* 104 (*nomen.*) *Wright Cub., n.* 132. Also in Florida, Austin in hb. Tuck.

26. **A. explanata,** Nyl. Thallus greenish-white, determinate or bordered by a dark line. Apoth. pale white, obsoletely greyish pruinose, depressed, plane, dilated, difform, now as it were indeterminate, very thin. Spores oblong or oblong-ovoid, 4 locular, .016–18 by .006 mm. Reaction vinous red.—*Pr. N. Gr., p.* 99. New Grenada.

27. **A. gyalectoides,** Müll. Arg. Thallus thin, white, mealy, effuse. Apoth. flesh-colored, depressed-concave, orbicular or slightly irregular, at first margined by the torn thallus, when young white pruinose. Spores 5 locular, .018–20 by .006–7 mm., the upper cell larger.—*Beitr., n.* 1000.—Tropical in hb. Fée.

28. **A. nivea,** n. sp. Thallus snow-white, somewhat mealy, indeterminate. Apoth. pale brown, suffused with the thallus, adnate, rounded and oblong, plane. Spores ovoid, 4 locular, .018–22 by .007–9 mm. Reaction blue, as also of the thallus.—Galapagos Islands, Hassler Exp.

29. **A. Loangana,** Müll. Arg. Thallus thin, white, somewhat mealy. Apoth. yellowish or dirty-white, suborbicular, lobate-angulose, plane. Spores finger-shaped, straight or slightly curved, obtuse, 6–7 locular, .017–20 by .005–55 mm., the intermediate cells larger.—*West Africa*, *p.* 39. In *Lich. Montevid.*, *p.* 5, it is called *A. Loandana*.—Loango, West Africa.

30. **A. lactea,** Müll. Arg. Thallus thin, milk-white, somewhat mealy. Apoth. whitish flesh-colored, subangulose-orbicular, or often a little elongated. Spores fusiform, obtuse, 6 locular, .025–30 by .0035–65 mm., the two middle cells larger.—*Montevid.*, *p.* 5.—S. America.

["**A. lactea,** Mont. sub. Chiod.," in Müll. Arg. *Sched. Graph. Cub.* (*Wright Cub.*, *n.* 183,) has in my specimen muriform spores resembling those of *A. tædiosa*. Whether this is the same as *Chiodecton Montagnei Tuck. Gen.*, *p.* 215 (*C. lacteum Mont. Cub.*, *p.* 161,) I am unable to say.]

31. **A. fissurinea,** Nyl. Thallus thin, white. Apoth. pale, innate, sublanecolate, slightly concave, indistinctly bordered by the thallus. Spores ovoid, 8–10 locular, .028–32 by .009–11 mm. Reaction from blue fulvous red.—*Flora* 1885, *p.* 447.—Florida in herb. Tuck.

32. **A. fissurinella,** Nyl. Thallus white or whitish ash-colored, thin, subrugulose. Apoth pale-white, small, fissurinæform, erumpent, lanceolate or subangulose, with a suberect thalline margin. Spores ovoid-oblong, 6–10 locular, .024–36 by .008–10 mm. Reaction from blue vinous red.—*Flora* 1869, *p.* 125.—Brazil.

33. **A. erupta,** Nyl. Thallus thin, white. Apoth. erumpent, lanceolate, margined by the thallus, the disk dilated, pale. Spores oblong-ovoid, 4 locular, .013–15 by .0035–5 mm. *Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub. n.* 120 *h.* Florida, *Eckfeldt Cat.*, *p.* 8. Texas, Mead.

34. **A. leucographella,** Müll. Arg. Thallus whitish ash-colored. Apoth. innate, at length a little emergent, elongated, externally perceptible by a narrow, somewhat interruptedly white-bordered cleft, and imperfectly reticulate-subconfluent, pale orange-pruinose. Spores elliptic-fusiform, the ends narrowed and obtuse, 8–10 locular, the intermediate cells larger, .065 by .022–25 mm.—*Paraguay*, *p.* 25.—Paraguay, S. Am.

35. **A. leucoschisma,** Müll. Arg. Thallus white, thin, smooth. Apoth. lirellate, rimose, mealy-white, very slender, bordered by the connivent lips of the thallus, fissurinæform, within pale. Spores oblong-ovoid, (6)–8 locular, the intermediate cells larger.—*Beitr., n.* 1489.—Cochin China.

36. **A. vernans,** Willey. Thallus whitish-green, powdery, determinate. Apoth. pale, innate, angular, dilated, plane. Spores oblong, 10–16 locular, .040–44 by .010–15 mm.—*Suppl., p.* 53.—Florida, Miss Wilson. I have seen only a single small specimen.

37. **A. conturbata,** Nyl. Thallus thin, white, determinate, limited by a black line. Apoth. pale, slender, intricate-elongated, uneven. Spores oblong, 8–12 locular, .035–48 by .012–17 mm. Reaction blue.—*Pr. N. Gr., p.* 98.—Tampico, Mexico.

38. **A. albovirens,** Nyl. Thallus thin, green, limited by a black line. Apoth. white, somewhat convex, adnate, difform. Spores fusiform-oblong, 10–16 locular, .070–80 by .037–32 mm. Reaction of the hymenium blue, of the thekes vinous red.—*Syn. N. Caled. p.* 64.—New Caledonia.

39. **A. nadenaria,** Nyl. Thallus thin, white, determinate. Apoth. of the same color, rounded or somewhat difform, slightly convex, verrucæform. Spores fusiform-oblong, 12 locular, .158–200 by .049–61 mm. Reaction of the hymenium blue, of the spores pale rose-color.—*Pr. N. Gr., p.* 102.—New Grenada. Spores figured in *Edit.* 1, *t.* 2 *f.* 50.

40. **A. Hampeana,** Müll. Arg. Thallus thin, olive-green, bordered by a black line, smooth or obsoletely granulose, now evanescent. Apoth. white, depressed-hemispherical, elliptical or subangulose, plano-convex, margined by the thallus. Spores elongate-ellipsoid, about 16 locular, .055–70 by .018–23 mm. *Phlyctidia Beitr., n.* 220, *dein Arthonia ibid., n.* 280.—S. America.

To this section also belong Wright. Cub., 47, 218, 761, 762, 763, not yet described; perhaps two species.

†† Apoth. crimson, or violet-brown, or purple.

41. **A. pyrrhula,** Nyl. Thallus thin, white, determinate. Apoth. crimson, linear, subsimple or sparingly branched, often angulate-flexuous, innate, plane. Spores oblong, 6–8 locular, .030–36 by .015 mm. Reaction from blue vinous red.—*En. p.* 337 (*nomen*), *Flora* 1885, *p.* 447, (*descr.*), *non Tuck. Gen., p.* 220. Said in the place cited to be from N. Carolina in hb. Tuck., but the plant here described was not among his Arthonias when I examined them. The plant to which Tuck. gave the name *in litt.*, is *A. pyrrhuliza*

Nyl., which has been distributed as *A. pyrrhula*, to which I refer a Florida lichen in hb. Calkins, the spores of which, however, measure .038–54 by .016–18 mm.

42. **A. Wilmsiana,** Müll. Arg. Thallus thin, white, mealy, at length innately rimulose, indeterminate. Apoth. crimson-purple, orbicular-angulose, stoutly and broadly irregularly subramulose and substellate, plane, roughish. Spores 4–6 locular, the intermediate cells a little larger than the terminal ones, .038 by .014–16 mm.—*Beitr., n.* 1052. *Exs. Lojka Univ., n.* 95.—Australia.

43. **A. gregaria,** (Weig.) Kbr. Thallus thin, white, greyish or now rose-colored, indeterminate. Apoth. reddish or violet-brown, and now blackening, usually besprinkled with crimson granules, naked or white pruinose, various in form, oblong, difform, linear or stellate, scattered or aggregated. Spores ovoid, 4–6 locular, brown or decolorate, the upper cell larger, .013–24 by .005–9 mm., figured in Hepp., n. 162, 163, but not very exactly. Reaction from blue vinous red or purplish.—*Sphæria Weig. Obs. Bot.*, 1772, *p.* 43, *and t.* 2, *f.* 10. *Arthonia Kbr. Syst., p.* 291. *Almq., p.* 26, (*non. Fée Ess., p.* 50, which is *Sarcographa inquinans Fée Suppl., p.* 45, *fide Mull. Arg. Graph. Fée. p.* 64.) *A. cinnabarina Wallr. Crypt Germ. I, p.* 320, *Nyl. Arth., p.* 98, *Pr. Gall., p.* 409 *and auctt. Coniocarpon DC. Fl. Fr. II, p.* 323, *Fr. L. E., p.* 379, *Mass. Ric., p.* 46, *and C. radiatum, ibid. p.* 47. *Spiloma tumidulum Ach. Syn., p.* 1, *and S. rubrum Pers. in Ach., L. U., p.* 16. A lichen of world-wide distribution, occurring in N. America from the Gulf States to New York, and on the Pacific coast in California and Oregon.—*Exs. Wright Cub., n.* 123, 130, 206, 428, in various forms; *Lojka Hungar., n.* 144.

Var. kermesina, (Schær.) Nyl. Thallus and apoth. crimson.—*Lepra Schær. En., p.* 240. *Nyl. Scand., p.* 257. *Leight. Gr. Brit., p.* 399, distinguishes *ff. cinnabarina, rosacea, and marginata, Turn. and Borr.*—Europe.

Var. pruinata, Del. Apoth. entirely white pruinose. *Nyl. Scand., p.* 257, *Pr. Gall., p.* 164. *Leight. Gr. Brit., p.* 399.—Europe.

F. concolor, T. & B. Apoth. convex, of the same color as the thallus.—Leight., l. c. *A. affinis Mass. Mem., p.* 47, *fide Almq., l. c.*

F. dubia, T. & B. Apoth. dark purple, and *f. microstigma* T. & B., apoth. minute, depressed. Both white pruinose.—Leight., l. c.

Var. anerythræa, Nyl. Apoth. elongated or stellate, blackening, destitute of crimson granules.—*Scand., p.* 257.—Europe. New York and Oregon.

F. detrita, T. & B. Apoth. depressed, dark purple, naked, more or less stellate.—*Leight. l. c., p.* 400.—England.

F. astroidea, T. & B. Apoth. rather large, clustered, stellate, dark reddish-black and blackening.—*Leight., l. c., p.* 400.—England.

Var. violacea, (Pers.) Nyl. Apoth. violet, the hypothecium almost colorless. Spores 5-locular, pale brown.—*A. violacea Pers. in Nyl. Arth., p.* 89.—Ladrone Islands.

Var. adspersa, (Mont.) Nyl. Apoth. violet-brown, obtuse or sublobate, the margin white pruinose. Spores .020–23 by .007–8 mm.—*Ustalia, Mont. Ann. Sci. Nat.* 2, *xviii, p.* 278. *Arthonia Nyl. Arth., p.* 89, *Pr. N. Gr., p.* 97. *Tuck. Gen., p.* 220. *Kph. Sud. See. Ins., p.* 15. *A. adspersa Nyl. N. Zeal.*, 1888, *p.* 19; "*vix nisi subsp. A. cinnabarinæ.*" *A. albida Kn. & Mitt. N. Zeal., p.* 105, *fide Nyl. N. Zeal. Leiogramma tenellum Eschw. Braz., p.* 101, *fide Mull. Arg. Revis. Eschw. II, p.* 9. *Conioloma coccineum, Eschw. Braz., p.* 170, *fide Mull. Arg. l. c. II, p.* 13.—Kph. l. c. finally concludes that it is a distinct species.—Tropical. Florida in hb. Tuck.

Var. substellata, (Eschw.) Müll. Arg. Thallus white, limited by a dark border, reddening when wet. Apoth. linear, short and stout, stellate-fewradiate, when dry blackish, when wet brown or reddish-brown, within reddish, turgid, naked. Spores brown. *A. polymorpha v. substellata, Eschw. Braz. p.* 113, *excl. syn.: Mull. Arg. Revis. II, p.* 12.—Brazil.

Var. opegraphina, Leight., referred to by Müll. Arg. in *Beitr., n.* 1492, who cites *Leight. Gr. Brit., p.* 423, is not found in the first edition of that work, but is mentioned in *Grevillea*, 1872, *p.* 59, *and t.* 4, *f.* 7, as *A. astroidea v. opegraphina* Ach. and is referred to *A. gregaria*, as is also *A. epipastoides* Nyl. (*t.* 4, *f.* 8.) The spores as figured agree with those of *A. gregaria*. But the plant last named is certainly not the true *epipastoides* Nyl. Müller's plant occurs in Cochin China.—Leighton's plants may perhaps well be referred to *v. anerythræa*.

44. **A. ochrocincta,** Nyl. Apoth. minute, numerous, rounded, plane, the disk white pruinose, the margin crimson.—*Flora* 1886, *p.* 104 (*nomen.*) *Exs. Wright. Cub., n.* 134, 212.—Hardly more than a form of the preceding.

45. **A. Meissneri,** Müll. Arg. Thallus ——. Apoth. purple or dark crimson-brown, orbicular and oblong, often stelloid-confluent, naked. Spores pyriform-panduriform, 4 locular, the two middle cells smaller, .010–14 by .0045–55 mm.—*Graphid. Fée. p.* 54. *Coniocarpon extensum Meissn. in Fée Suppl., p.* 95 *and t.* 42, *f. c. Lecidea cuticula ibid., p.* 109, *non Ess. p.* 112.—Tropical in hb. Fée.

46. **A. lilacina,** Mont. Thallus thin, whitish ash-colored, effuse. Apoth. lilac-purple, punctiform, roundish, convex. Spores 4 locular.—*Syll. p.* 353, *Java, p.* 52.—Java.

47. **A. epiodes,** Nyl. Thallus thin, white, subdeterminate. Apoth. black or blackening, rounded or oblong, plane, within dark, the epithecium covered with a thick violet stratum. Spores ovoid-oblong, 8 locular, brown, .032–40 by .010–14 mm. Reaction dark vinous red. Spermatia .005–6 mm. long.—*N. Zeal.* 1888, *p.* 121. "Forsan optime disponenda prope *A. cinnabarinam.*"—New Zealand.

††† Apoth. yellow, cinnamon-colored or reddish-brown, often blackening.

48. **A. elegans,** (Ach.) Almq. Thallus thin, leprous, whitish ash-colored. Apoth. dark yellow, crowded, lobate-difform or stellate. Spores ovoid, 4 locular, the upper cell larger, .015–18 by .007–8 mm.; figured in Hepp., n. 354. Reaction blue.—*Almq., p.* 19. *Spiloma Ach. Syn., p.* 1. *A. ochracea Duf. Revis. du genre Opeg., p.* 8. *Kbr. Syst., p.* 292. *Coniocarpon Fr. S. O. V., p.* 228, *L. E., p.* 380. *Mass. Ric., p.* 47. *A. cinnabarina v. ochracea Nyl. Arth., p.* 89, *Pr. Gall., p.* 164. *Exs. Lojka Univ., n.* 41.—Europe.

49. **A. cinnamomea,** Müll. Arg. Thallus thin, white, limited by a dark line. Apoth. cinnamon-colored, orbicular, now confluent, planoconvex, marginate when young, within pale. Spores oblong-ovoid, 4 locular, .015 by .005 mm., the two middle cells smaller.—*Beitr., n.* 224.—S. America.

50. **A. septemlocularis,** Müll. Arg. Thallus thin, clayey-white, limited by a dark line. Apoth. dark cinnamon-brown, orbicular, depressed-hemispherical, bordered by an evanescent paler margin, two often confluent, within reddish-brown. Spores decolorate or pale brown, cylindrical-obovoid, 6–12 locular, the upper cell larger, .028–35 by .007–8 mm.—*Beitr., n.* 222.—*New Grenada. Exs. Lindig., n.* 2610, *p. p.*

51. **A. noli-tangere,** (Mont.) Nyl. Thallus floccose, composed of intertangled yellowish-green filaments. Apoth. tawny flesh-colored, innate, orbicular, depressed, somewhat margined by the thallus, sprinkled with green granules. Spores fusiform, 4 locular, .018 by .005 mm.—*Cilicia Mont. Ann. Sci. Nat.* 1834, *p.* 275 *and t.* 16, *f.* 2. *Chrysothrix ibid. Chil., p.* 212, *Syll., p.* 382, *Mass. Monogr. in Att. Ven.* 1859, *p.* 499, *and t.* 3. *Stitz. Beitr., p.* 141. *Arthonia Nyl. Ann. Sci. Nat. ser.* 4, *III, p.* 186, *Kph. Novara Voy., p.* 108.—South America. Tuckerman in *Gen., p.* 219, considers it analogous to *Cœnogonium.*

52. **A. ochrodes,** Nyl. Thallus thin, white. Apoth. minute, dark reddish-brown, rounded or oblong, numerous, somewhat convex. Spores ovoid, 4 locular, the upper cell larger, .016–18 by .006–7 mm. Reaction from blue vinous red.—*Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub.*, *n.* 135.—Cuba.

53. **A. ochraceella,** Nyl. Thallus thin, white. Apoth. reddish-brown, innate, linear, elongated, simple or sparingly branched. Spores ovoid, 5 locular, the upper cell larger, .032–36 by 016–18 mm. Reaction from blue vinous red.—*Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub.*, *n.* 121.—Cuba.

54. **A. ochrospila,** Nyl. Thallus thin, white, limited by a dark line. Apoth. reddish-brown, innate, linear, simple or sparingly branched. Spores ellipsoid, 4–6 locular, .045–58 by .018–23 mm. Reaction blue.—*Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub.*, *n.* 210.—Cuba.

55. **A. Cascarillæ,** (Fée) Nyl. Thallus inconspicuous. Apoth. dark violet or brown, or obsoletely violaceous, innate, minute, numerous, rounded or difform. Spores oblong-ovoid, 4 locular, 014–16 by .005 mm. Reaction blue then reddening. — *Conocarpon Fée Ess.*, *p.* 98 *and t.* 15, *f.* 4. *Suppl.*, *t.* 42, *f.* 3. *Nyl. En.*, *p.* 32, *Flora* 1885, *p.* 447, (*descr.*) "Vix differens ab *A. adspersam* (Mont.) nisi apoth. minoribus simplicibus." *Mull. Arg. Graph. Fée*, *p.* 53, (*descr.*) "Sporae .015–17 long, .005–55 latae, oblongato-fusiformi-obovoideæ, 4 loc., loculus summus reliquis multo major." —Tropical.—*A. Cascarillæ* (Fée) *Leight. Gr. Brit.*, *p.* 394, judging by a specimen from himself, seems to belong elsewhere.

56. **A. Ravenelii,** Tuck. Thallus thin, white. Apoth. dark reddish-brown and blackening, minute, numerous, rounded or oblong, plane, within paler. Spores in clavate thekes, oblong-ovoid, 4–8 locular, .015–23 by .007–9 mm., the upper cell larger. Reaction of the external parts of the apoth. blue, of the thekes vinous red. Texas *in hb. Tuck.*, also in *hb. Eckfeldt*, but with larger spores, .023–30 by .009–10 mm.

57. **A. viridicans,** n. sp. Thallus thin, green, limited, and now intersected by black lines. Apoth. dark brown or blackening, paler when wet, small, rounded or oblong, adnate, slightly convex. Spores ovoid, 4 locular, .013–15 by .005–6 mm. Reaction vinous red.—Texas, E. D. Mead, 1885. Sent to Nyl. under n. 73.

58. **A. compensata,** Nyl. Thallus thin, white. Apoth. dark reddish-brown, and finally blackening, rounded or elliptical, or more elongated and flexuous, plane, white pruinose, at length naked.

Spores ovoid, 4–5 locular, the upper cell larger, .018–27 by .009–12 mm.—*Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub.*, *n.* 119*e*, 126.—Cuba.

59. **A. compensatula,** Nyl. Thallus thin, white. Apoth. blackening, minute, punctiform, rounded or oblong. Spores ovoid, 5–6 locular, .023–35 by .011–13 mm. *Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub. n.* 120.—Cuba.

Var. lineolans, Nyl. *Mudl. Arg. Sched. Graph. Cub.* (*nomen.*) *Exs. Wright Cub.*, *n.* 129.

60. **A. septisepta,** Nyl. Thallus thin, white. Apoth. brown and blackening, oblong or irregularly lobate, at first margined by the thallus, plane. Spores oblong-ovoid, 7 locular, .022–27 by .007–9 mm. Reaction vinous red.—*Flora* 1886, *p.* 104, (*nomen.*) *Exs. Wright Cub.*, *n.* 119.—Cuba.

61. **A. septiseptella,** Nyl. Thallus thin, white. Apoth. blackening, elongated, flexuous, narrow. Spores fusiform-oblong, 7 locular, .022–25 by .006–7 mm. Reaction vinous red.—*Flora* 1886, *p.* 104 (*nomen.*) *Exs. Wright. Cub. n.* 120*e*.—Cuba.—A very meagre plant from Alabama *in hb. Tuck.* perhaps belongs here.

62. **A. caribæa,** (Ach.) Nyl. Thallus thin, white, determinate. Apoth. pale brown or brown, dendritic-ramose. Spores ovoid or oblong-ovoid, decolorate or pale brown, 6 locular, .040–48 by .017–22 mm. Reaction of the hymenium blue, of the thekes vinous red. —*Graphis Ach. Syn. p.* 86. *Fée Ess. p.* 43 *and t.* 7, *f.* 4. *Nyl. Arth. p.* 89, *Pr. N. Gr. p.* 98, *Syn. N. Caled. p.* 61 (*descr.*) *Mudl. Arg. Graph. Fée*, *p.* 56. "Sporæ vulgo 6–7 loculares, loculi terminales ad utramque extremitatem reliquis multo majores."—Tropical.

63. **A. rubella,** (Fée) Nyl. Thallus inconspicuous. Apoth. reddish-brown and blackening, innate, slender, flexuous and branching. Spores oblong-ovoid, 4–6 locular, the upper and often the lower cell larger, brown or decolorate, .025–43 by .010–15 mm. Reaction of the hymenium blue, of the thekes vinous red. Spermatia in a S. Carolina specimen, straight, .006 mm. long.—*Graphis Fée Ess. p.* 43 *and t.* 11 *f.* 5. *Nyl. Arth. p.* 89, *Pr. N. Gr. p.* 98. *Mudl. & Arg. Graph. Fée*, *p.* 56. *A. rufella Nyl. Chil. p.* 170. *Ustalia figurata Fr. S. O. V. p.* 289, *fide Mudl. Arg. l. c. Exs. Lindig n.* 2654, *Wright Cub. n.* 65, 118 *a*, *b*, *c*.—Tropical. Southern States *in hb. Tuck.*, but probably not all the specimens so named. One from the Sandwich Islands appears to be *A. polygramma.*

64. **A. subrubella,** Nyl. Thallus inconspicuous. Apoth. pale or pale brown, linear, simple, or sparingly branched, narrow, appressed. Spores oblong, brown or decolorate, 6 locular, .045–54 by

.016–18 mm. Reaction blue.—*Pr. N. Gr. p.* 98. *In Flora* 1880, *p.* 128, *Graphis Caribæa Fée*, is given as a synonym of the plant from the Antilles, and the spores are described as 6–8 locular, 044–48 by .620–25 mm. A Florida lichen in hb. Sprague, referred here by Nyl., has the apoth reddish-brown, and now stellate branched. Spores 6–8 locular, .020–30 by .011–18 mm. According to Müll-Arg. *Graph. Fée, p.* 56, it occurs in hb. Fée under *Graphis endocarpa* p. p., and *G. caribæa*, p. p., and the two middle cells are larger.—? *Wright Cub. n.* 215.—Tropical.—There is perhaps still some confusion between this and the two preceding species.

65. **A. astroidestera,** Nyl. Similar to *A. astroidea*, but the apoth. brown, and more distinctly stellate. Spores 4–6 locular, .021–26 by .007–8 mm. *Flora* 1874, *p.* 349.—England.

66. **A. catenatula,** Nyl. Thallus thin, white, limited by a black line. Apoth. pale but darkening, elongated, slender, somewhat interruptedly linear, now branched and geniculately flexuous. Spores ovoid, 6 locular, .032–55 by .020–23 mm. Reaction from blue vinous red.—*Ins. Andam., p.* 14.—Andaman Islands, Bay of Bengal.

67. **A. novella,** Kph. Thallus white or pale rose-colored, bordered by a dark line, irregularly expanded. Apoth. blackish-brown or blackening, numerous, innate, short, somewhat lirellæform, variously flexuous, simple or branched, bordered by a thin thalline margin. Spores ovoid-oblong, 4 locular, .014–15 by .004–5 mm.—*Flora* 1876, *p.* 481.—Brazil.

68. **A. subnovella,** Müll. Arg. Thallus white, smooth. Apoth. dark reddish-brown, more or less stellate ramose, minute, slender, slightly emergent, soon naked. Spores oblong-ovoid, 4–5 locular, .015–20 by .005–75 mm., the upper cell larger.—*Parag., p.* 25.—Paraguay.

69. **A. Thozetiana,** Mull. Arg. Thallus thin, white, here and there intersected by black hypothalline lines. Apoth. blackish-red and blackening, linear, simple or more often somewhat stellate-few-branched, bordered by a thin darker margin, when young greyish pruinose, at length naked, paler when wet. Spores oblong-ovoid, 4 locular, .012–13 by .005 mm.—*Beitr., n.* 524.—*Shirley*, 1889, *p.* 151.—Australia.

70. **A. conferta,** (Fée) Nyl. Thallus inconspicuous. Apoth. dark-brown and blackening, immersed, substellate or sublobate, or irregularly dilated, plane. Spores oblong-ovoid, 6 locular, .016–21 by .006–8 mm., according to Müll. Arg. the two middle cells larger. Reaction blue.—*Coniocarpon Fée Suppl., p.* 95 *and t.* 42 *f.* 5. *Nyl. En., p.* 132. *Mull. Arg. Graph. Fée, p.* 55. *A. polymorpha v. substellata Ach. Syn. p.* 7. *A. substellata Nyl. Pr. N. Gr., p.* 106,

Syn. N. Caled., p. 62. *Graphis atrata Fée Ess., p.* 35, *Suppl., p.* 27, *t.* 39, *p. p. fide Mull. Arg. l. c.*—Tropical.—A lichen from Texas and Florida in hb. Tuck., and from Bermuda in hb. Farlow, called by Tuckerman *A. atrata Fée*, seems to be the plant here described. Spores in Farlow's plant 4–6 locular, .018–22 by .007–9 mm.

71. **A. fuscescens,** Fée. Thallus fuscescent, limited by a dark line. Apoth. when dry dark-brown and blackening, when wet distinctly brown, minute, simple, branched and stellate. Spores 6 locular, the upper cell larger, .015–17 by .005–6 mm.—*Ess. p.* 56 *and t.* 13, *f.* 8, *Suppl. p.* 41, *t.* 40, *f.* 14. *Mull. Arg. Graph. Fée, p.* 55. A. Guiana lichen in hb. Tuck. named "*A. fuscescens Fée fide Mont.*," does not seem to be the same as the plant here described.

72. **A. serialis,** Müll. Arg. Thallus pale reddish, effuse. Apoth. brown, irregularly orbicular, stellate-angulose, confluent or nearly so in nodulose-linear, somewhat flexuous, entire or obsoletely ramulose series, suffused with the thallus and somewhat cinerascent, at length naked, within pale. Spores oblong-ovoid, 6 locular, the upper cell larger, .021–23 by .009–10 mm.—*Graph Fée, p.* 56 (*non Beitr., n.* 1449.) *Coniocarpon caribœum Fée Ess., p.* 99, *p. p.*—Tropical in hb. Fée.

73. **A. variabilis,** Müll. Arg. Thallus thin, white. Apoth. blackish-brown, paler when wet, variable in outline, from suborbicular, oblong, angulose, stellate, or larger and linear and now bifurcate, or Opuntia-like uneven. Spores fusiform oblong, 6–8 locular, the extreme cells larger. (Dimensions omitted.)—*Beitr. n.* 1096. —Australia.

74. **A. angulosa,** Müll. Arg. Thallus thin, white. Apoth. brownish flesh-colored, brown when dry, imperfectly stellate-angulose, irregular, plane. Spores decolorate or pale brown, oblong-ovoid, 5 locular, the upper cell larger, .020–24 by .007–9 mm.—*Beitr., n.* 1095.—Australia.

75. **A. polygramma,** Nyl. Thallus thin, white, somewhat mealy. Apoth. brownish-black, innate, plane, stellate or changeable in form, crowded, middling-sized or smaller, thinly white pruinose. Spores ovoid, 4 locular, .017–22 by .007–8 mm. Reaction from blue vinous red.—*Pr. N. Gr. p.* 99. *Exs. Lindig*, 817, 2784, *Wright Cub., n.* 120, *b. d. f.*, 125, *a, d*, 136, 139.—The spores in Lindig n. 817, from hb. Tuck., are 4–5 locular, the upper cell larger, .018–23 by .005–6 mm., and those of Wright Cub. n. 136 are similar, and meagre Florida specimens in hb. Calkins seem to agree sufficiently with this plant. But *Wright, n.* 120 *b*, referred here with a ? by Müll. Arg. in Sched., has ovoid 4 locular spores, the

upper cells larger, .016–18 by .007–8 mm., and has a different aspect. Under the same number is a different plant with plurilocular spores. See *post.*, n. 106.

Var. denudata, Nyl. l. c. Apoth. naked, blackening.—*Exs. Lindig, n.* 890.

76. **A. varia,** (Ach.) Nyl. Thallus inconspicuous. Apoth. brown and blackening, linear and dendritic ramose. Spores ovoid, 4 locular, .014–18 by .0045–55 mm. Reaction blue.—*Opegrapha abnormis v. varia Ach. Syn. p.* 86. *Nyl. Pr. N. Gr. p.* 98. *Syn. N. Caled., p.* 60. *Mull. Arg. Graph. Fée. p.* 54, who says the upper cell of the spores is larger, and such spores occur in Florida specimens, probably to be referred here. *A. stenographella Nyl. Pr. N. Gr., p.* 99, *fide seipso Syn. N. Caled. l. c. Opegrapha epipasta v. Bonplandiæ Fée Ess. p.* 26 *fide Mull. Arg. l. c. Ustalia gracilis Eschw. Bras., p* 105, *excl. syn. fide Mull. Arg. Revis. Eschw. II, p.* 10. who says the species name should be *A. gracilis. Coniocarpon gracile Kph. Amboin., p.* 9, *excl. syn. rubella.*—Tropical. Florida in hb. Tuck. *det.* Nyl. "*A. stenographella*" in hb. Tuck. from Bonin Islands, U. S. expl. exp.

77. **A. variella,** Nyl. Thallus thin, white. Apoth. brown and blackening, somewhat prominent, linear and lobate. Spores fusiform, 4 locular, .013–15 by .003–5 mm. *Flora* 1886, *p.* 104 (*nomen.*) *Exs. Wright Cub. n.* 133*a*.

78. **A. subvaria,** Nyl. *Flora* 1886. *p.* 104 (*nomen.*) *Exs. Wright Cub. n.* 133*b*. Not in my collection, but appears to belong here.

79. **A. erubescens,** Willey. Thallus thin, pale green. Apoth. pale reddish-brown, minute, rounded, oblong, or angulate-lobate, plane. Spores ovoid, 4–5 locular, .013–18 by .005–7 mm.—*Suppl. p.* 53.—Texas in hb. Higginson.

80. **A. perminuta.** n. sp. Thallus thin, pale yellow, effuse. Apoth. very minute, dark brown and blackening, paler when wet, adnate, rounded or oblong, plane. Spores fusiform-oblong, 6–7 locular, .018–23 by .004–55 mm. Reaction of the thekes vinous red. —Florida, E. D. Mead, 1885.

81. **A. phæonephela,** Nyl. Thallus, thin, white, obscurely limited. Apoth. brown, small, difform, variously substellate or aggregated. Spores oblong, 4–6 locular, .012–15 by .0045–5 mm. Reaction vinous red.—*Syn. N. Caled. p.* 62.—New Caledonia.

82. **A. analogella,** Nyl. Thallus pale ash-colored or white, indeterminate. Apoth. black or blackening, very minute, somewhat interruptedly linear difform, or divided, and substellate. Spores

ovoid, 5–6 locular, .012–17 by .004–6 mm. Reaction dark vinous red.—*Pr. N. Gr. p.* 573.—New Grenada. Nyl.' *Syn. N. Caled. p.* 62, says there is little difference between this and the preceding.

83. **A. vernicis,** Müll. Arg. Thallus inconspicuous, forming a yellowish ash-colored or white stain. Apoth. blackish-brown, suborbicular, incised-lobate at the circumference, plane, persistently veiled by the rimose-erumpent epidermis, whence greyish-black. Spores cylindrical-obovoid, at length brown, 5–6 locular, .011–15 by .005–6 mm.—*Flora* 1879, *p.* 487.—Japan

84. **A. pyrrhuliza,** Nyl. Thallus thin, white, limited by a narrow dark line. Apoth. reddish, slender, variously divided. Spores ovoid, brown or decolorate, 4 locular, .012–15 by .0045 mm. Reaction from blue dark red.—*Flora* 1885, *p.* 447. On holly, oak, pine and other trunks, New Bedford, the spores now 5 locular. White Mountains, H. Mann; Vermont, C. G. Pringle; and perhaps the same, New York, Willey.—*A. medusæa* Tuck. *in litt. ad Nyl.*, a coarser, blackening lichen, with larger spores, reaching .016–23 by .006–8 mm., is what he afterwards supposed to be *A. pyrrhula*, and has been distributed with the plant described by Nyl. under that name. The two probably do not differ.

85. **A. astropica,** Kph. Thallus thin, pale. Apoth. brown, plane, stellate-radiate, somewhat thickened and obtuse at the extremities, or more rarely difform-ramulose. Spores 4, ovoid, 4 locular, .017–19 by .006–7 mm.—*Flora* 1873, *p.* 2, (in reprint.)—China.

86. **A. fuscoalbella,** Nyl. Thallus thin, white, determinate. Apoth. brownish-black or brown, or becoming paler, minute, oblong-difform or subramose, plane or uneven, within paler. Spores oblong or ovoid-oblong, 4 locular, .016–20 by .006–7 mm. Reaction vinous red.—*Pr. N. Gr., p.* 100. *Exs. Lindig, n.* 850, 2883.—New Grenada.

87. **A. pulicosa,** Nyl. Thallus white, effuse, rugose-uneven, or plicate-diffract. Apoth. brown or brownish-black, when wet brownish-red, oblong, (rounded or sublinear or somewhat difform,) plane, small, often somewhat crowded, within pale. Spores oblong-ovoid, at length brown, 4 locular, .011–16 by .0045 mm. Reaction blue.—*Pr. N. Gr. p.* 100.—New Grenada.

88. **A. ulcerosula.** Nyl. Thallus thin, white. Apoth. pale-brown, minute, ulcerose-heaped, elongate-difform, somewhat pruinose. Spores ovoid, 4–6 locular, .018–21 by .007–8 mm. Reaction from blue dark red.—*Andam., p.* 15.—Mauritius.

89. **A. circumalbicans,** Nyl. Thallus thin, white, obscurely limited. Apoth. blackening, minute, subangulose or sublobate, surrounded by a white, thin, or obsolete proper margin, enclosed in

a more distinct thalline one. Spores ovoid, brown with age, 4–5 locular, .017–21 by .007–10 mm. Reaction vinous red.—*Flora* 1867, *p.* 7, *Syn. N. Caled.*, *p.* 62.—New Caledonia, India.

90. **A. platyspeilea,** Nyl. Thallus thin, white, determinate, or more often limited by a dark line. Apoth from pale becoming reddish-brown, plane, depressed, dilated, naked or white pruinose, rounded-difform or oblong, often somewhat confluent. Spores oblong, 8 locular, .022–30 by .009–11 mm. Reaction blue.—*Pr. N. Gr. p.* 99.—Mexico. Florida in hb. Tuck., the spores 8–10 locular, the middle cells larger, .023–30 by .009–11 mm.—Galapagos Islands, *Hassler Exp.* the spores similar to those of the Florida plant. Some of the Galapagos specimens have the spores 4–8 locular, but do not appear to differ otherwise.

91. **A. cyanea,** Müll. Arg. Thallus thin, greyish-white, the margin effuse. Apoth. blackish-brown, plane, angulose-orbicular, intensely purple or greyish-purple pruinose, within dark. Spores dactyloid-ovoid, 4 locular, .016–19 by .005–55 mm., the upper cell larger.—*Beitr.*, n. 303.—On leaves, Bahia, S. Am., and Cuba.

92. **A. nebulosa,** (Stirt.) Müll. Arg. Thallus ——. Apoth. more or less confluent, surrounded by a broad, depressed, white crown. Spores 4–5 locular, .014–16 mm. long.—Platygrapha *Stirt. Lich. on leaves p.* 6. *Mull. Arg. Beitr.*, *n.* 691.—Brazil.—I have only seen the incomplete description in Beitr.

93. **A. microcarpa,** Müll. Arg. Thallus thin, olivaceous-white, effuse, at length diffract. Apoth. blackish-brown, numerous, minute, orbicular or subangulose, adnate, convex. Spores oblong-obovoid, 4 locular, .016–18 by .0045–5 mm.—*Beitr.*, *n.* 226.—S. America.

94. **A. Puigarii,** Müll. Arg. Thallus thin, green, effuse, somewhat powdery. Apoth. dark reddish-brown, blackish when dry, orbicular or obsoletely angulose, slightly convex, appressed, within red. Spores oblong-ovoid, 3–4 locular, the upper cell larger, .012–14 by .004–5 mm.—*Beitr.*, *n.* 162.—Brazil.

95. **A. Somaliensis,** Müll. Arg. Thallus thin, white, effuse. Apoth. when dry dark brown or blackening, when wet reddish-brown, orbicular, elliptical, or slightly angulose, two often confluent, plane, within paler. Spores 4 locular, .014–18 by .005–6 mm., the upper cell larger.—*Beitr.*, *n.* 965.—Somala, Africa.

96. **A. lecideella,** Nyl. Thallus green, continuous, uneven, effuse. Apoth. blackening, numerous, small, rounded, plane or somewhat convex, greenish pruinose, at length naked. Spores oblong-ovoid, 4 locular, .018–28 by .0055–7 mm. Reaction vinous

red.—*Nyl. En. p.* 337 (*nomen.*) *Tuck. Gen., p.* 221. *A. glaucina* Tuck. *in litt.*—North America, widely disseminated east of the Mississippi.

97. **A. cupressina,** Tuck. Thallus thin, white, leprous, effuse. Apoth. from pale brown becoming darker, minute, rounded, convex, greenish pruinose. Spores oblong or oblong-ovoid, 4 locular, .011–16 by .003–5 mm. Reaction blue.—*Genera, p.* 221.—On bark and dead wood of white cedar, New Bedford.

98. **A. albofuscescens,** Tuck. Thallus thin, white. Apoth. blackish-brown and blackening, adnate, oblong or angulose, plane. Spores ovoid, 4 locular, .010–15 by .004–5 mm.—Amherst, Mass., in hb. Tuck.

99. **A. hypochniza,** Nyl. Thallus thin, white, somewhat mealy. Apoth. brown, small, numerous, rounded or oblong. Spores ovoid. 4 locular, .013–16 by .004–5 mm. Reaction of the thekes vinous red.—*Flora* 1886, *p.* 104 (*nomen*) *Exs. Wright Cub. n.* 131.

100. **A. chiodectella,** Nyl. Thallus thin, glaucescent. Apoth. dirty or livid ash-colored, minute, plane, aggregated, somewhat rounded, white-margined, subpruinose, within pale. Spores ovoid or ovoid-oblong, 4–6 locular, .016–27 by .007–9 mm. Reaction vinous red.—*Flora* 1869, *p.* 125. *Tuck. Gen. p.* 220.—Louisiana and Texas in hb. Tuck.

101. **A. pellucida,** Müll. Arg. Thallus thin, white, continuous, shining, effuse. Apoth. commonly heaped or confluent, orbicular, and compoundly angulose-suborbicular, when dry brownish-blackening, when wet pellucid, naked, slightly convex, within pale. Spores cylindrical-obovoid, 4 locular, .012–15 by .003–45 mm.—*Revis. Eschw. II, p.* 10.—Brazil in hb. Eschweiler.

102. **A. pellicula,** Müll. Arg. Thallus thin, white, effuse. Apoth. when dry brownish-black, when wet pale and pellucid, orbicular or compositely angulose-suborbicular, slightly convex, within pale. Spores cylindrical-obovoid, 4 locular, .012–15 by .003–45 mm. —*Naum., p.* 56.—On leaves, Fiji Islands.

f. trichariosa, Müll. Arg. Thallus sterile, the margin piliform-isidiod.—*Mull. Arg. l. c.—Tricharia lencothrix Fée, Meth. p.* 87 *and t. III f. B.*—Tropical in hb. Fée.

103. **A. nigro-cincta,** Kn. & Mitt. "Thallus moderately thick, light brown or dull white, edged by a dark line. Apoth. blackish-brown, superficial, simple, irregular, roundish, oblong, curved, larger at one end. Spores obovate, 4 septate, light yellow, measuring from .00030 to .00084 of an inch."—*N. Zeal., p.* 106 *and t.* 12 *f.* 34.—Not mentioned in Nyl. *N. Zeal.*, 1888.—New Zealand.

104. **A. fusco-pallens,** Nyl. *Arth.*, *p.* 92 (*nomen.*,) perhaps belongs to this section.—Tropical America.

105. **A.** ——. Thallus white, uneven, determinate, bordered by a dark zone. Apoth dark brown and blackening, paler when wet, innate, minute, punctiform, rounded, numerous, often serially disposed. Spores ellipsoid, 8–12 locular, the middle cells commonly a little the largest, .030–36 by .010–12 mm. Reaction of the thekes vinous red.—*Wright Cub.*, *n.* 120*b*, *p. p.*

106. **A.** ——. Thallus thin, white. Apoth. brown, small, adnate, irregularly oblong, and mostly few branched, plane. Spores oblong-ellipsoid, narrowed at the ends, 6–8 locular, the middle cells larger, .054–76 by .018 mm. Reaction of the thekes and spores yellow.—*Wright Cub.*, *n.* 140½. "? *A.*, *status spilomatoides* (*n.* 140)" *Mull. Arg. in Sched.*

107. **A.** ——. Thallus thin, white. Apoth blackening, innate, linear, few and short branched. Spores ellipsoid, 8 locular, .018–23 by .007–9 mm.—*Wright Cub.*, *n.* 619.

108. **A.** ——. Thallus thickish, somewhat mealy and cottony within, pale green, indeterminate. Apoth. innate, pale flesh-colored, dilated, plane, rounded and variously irregular, margined by the thallus. Spores oblong-ovoid, 4 locular, .011–13 by .004–5 mm. Reaction blue.—*Wright Cub.*, *n.* 217, 218, 761, 762, 763, all apparently belonging to one species.

To this section may also belong *A. infuscata* and *A. myophœa* Kph. *N. Zeal.*, *p.* 44, from New Zealand. Descriptions not seen.

Stock of **A. biformis.**

109. **A. impolita,** (Ehrh.) Borr. Thallus effuse, white, tartareous, rimulose. Apoth. brown and blackening, rounded difform, or lobate, plane, pruinose, crowded or confluent, the hypothecium pale. Spores ovoid, 4–6 locular, .014–20 by 006–8 mm.; figured in Hepp., n. 535. Reaction from blue vinous red.—*Lichen impolitus Ehrh. Pl. Crypt.*, *n.* 274. *Borr. E. Bot.*, *n.* 2692. *Almq.*, *p.* 22, *Tuck. Gen.*, *p.* 220. *Parmelia Ach. Meth.*, *p.* 160, *Fr. L. E.*, *p.* 183. *Leprantha Kbr. Syst.*, *p.* 295, *Arthonia ibid. Pg.*, *p.* 268. *A. pruinosa Ach. Syn.*, *p.* 7, *Nyl. Arth.*, *p.* 90, *Pr. Gall.*, *p.* 411, *Scand.*, *p.* 258. *Lecanora fecunda Tuck. Calif.*, *p.* 20, *Gen. p.* 211, *Nyl. Syn. N. Caled.*, *p.* 60.—Europe; California.

Var lobata, Flk. Thallus white, determinate, tartareous, uneven, lobulate. Apoth. *fide Kbr.* dark brown, innate, roundish polygonal, confluent, greyish pruinose. Spores 4–6 locular, .018 by .006 mm.—*A. pruinosa var. Flk. L. D. n.* 22, *Nyl. Arth.*, *p.* 90.

A. impolita var. Schær. En., p. 243, *Almq., p.* 23. *A. lobata Mass. Ric., p.* 52 *and f.* 97. *Pachnolepia Kbr. Syst., p.* 296. *Exs. Lojka Hung., n.* 93.—On rocks and earth. Europe. *Pachnolepia decussata Kbr. Syst., p.* 297, *Pg., p.* 273 (Arthonia Fl. *Bot. Zeit.* 1850, *p.* 570,) is considered by Kbr. and Almq., p. 24, not to differ from *var. lobata*. But according to the latter, the original plant of Fl. is not an Arthonia but near to *Schismatomma* (*Lecanactis*) *abietinum*. According to *Lamy*, *n.* 556, Nyl considers it as rather a *Chiodecton* or the type of a new genus.

Var. subfusca, Nyl. Apoth. naked.—*Pr. Gall. p.* 165.

Var. chiodectonoides, Tuck. Apoth. minute, immersed in thalline warts.—California in hb. Tuck.

110. **A. medusula,** (Pers.) Nyl. Apoth. blackening, slender, radiate-divided, white-pruinose. Spores, as figured in Hepp., n. 898, 2–6 locular, .011–18 by .0025–5 mm. Spermatia staff-shaped, .004–5 mm. long. *Opegrapha Pers. Act. Wett.* 2, *p.* 15. *Nyl. En., p.* 132, *Flora* 1881, *p.* 6, *Almq., p.* 23. *A. pruinosa var. Nyl. Arth., p.* 61, *Pr. Gall., p.* 165.—Europe.

111. **A. limitata,** Nyl., *En., p.* 132, (*nomen.*,) as a subsp. of *A. pruinosa*.—Ceylon.

112. **A. impolitella,** Nyl., *Flora* 1867, *p.* 7, (not seen,) probably belongs to this division.—Calcutta.

113. **A. bæastroidea,** Nyl. Thallus thin, white, somewhat rugulose, indeterminate. Apoth. pale brown, innate, plane, stellate-difform. Spores oblong-ovoid, 6 locular, .016–17 by .006–7 mm. Reaction vinous red.—*Flora* 1881, *p.* 6. *Newton, Portugal lichens, p.* 67, to whom I am indebted for a specimen.—Portugal.

114. **A. biformis,** (Flk.) Schær. Thallus white, effuse, mealy. Apoth. brown and blackening, rounded, plane or convex, pruinose, within dark. Spores oblong-ovoid, 4–5 locular, the upper cell larger, .012–20 by .006-8 mm. Reaction from blue vinous red. Spermatia staff-shaped, .005–6 mm. long, figured in Hepp., n. 229. —*Lecidea Flk. D. L., n.* 122. *Arthonia Schær. En., p.* 243, *Nyl. Flora* 1878, *p.* 246. *Zw. Heid., n.* 458. *Lecanactis Kbr. Syst., p.* 277. *Pyrenothea Mass. Ric., p.* 152, *and P. byssacea ib., p.* 150. *P. stictica Fr. L. E., p.* 452, *p. p.* (*spermogonifera*) *and Parmelia impolita b, ibid., p.* 150. *Coniocarpon velatum Fl. in Zw. Exs., n.* 48. *Arthonia Nyl. Arth., p.* 91, *Pr. Gall., p.* 411, *Tuck. Gen., p.* 221. *Sphæria byssacea Weig. Obs. Bot., p.* 42, *Verrucaria Ach. Syn., p.* 97, *Arthonia Almq., p.* 25, this name based on a sterile plant.—Europe.

f. develata, Nyl. Thallus thin or inconspicuous. Apoth. naked, brown and blackening, rounded and oblong. Spores oblong-ovoid,

4–6 locular, .018–25 by .008–9 mm.—*A. velata f.*, Nyl. in *Tuck. Gen.*, *p.* 221.—Hampshire Co., Mass., in hb. Tuck. New Bedford, rare, and on firs in the White Mts. in hb. Willey.

115. **A. cæsia,** (Fl.) Kbr. Thallus thin, granulose leprose, rust-colored. Apoth. brown, minute, orbicular, plano-convex, greyish pruinose. Spores 4 locular, the cells equal. *Coniangium Fl. Exs.*, *n.* 117.—*Arthonia Kbr. Pg.*, *p.* 269, *Arn. Flora* 1864, *p.* 315, *Almq.*, *p.* 26. *Leprantha Kbr. Syst.*, *p.* 289. *Exs. Kbr. L. S. G.*, *n.* 77, *Lojka Univ.*, *n.* 94.—Europe.

116. **A. fuliginosa,** Fl. Thallus thin, ash-colored, somewhat mealy, rimose, uneven. Apoth. brown, adnate, rounded-difform, soon confluent, convex, pruinose or naked. Spores 4 locular, .020–24 by .007–9 mm., the upper cell larger. Reaction blue.—*Bot. Zeit.* 1850, *p.* 569, *Kbr. Pg.*, *p.* 268, *Almq.*, *p.* 27. *A. pruinosa var. Nyl. Arth.*, *p.* 90. *Leprantha Kbr. Syst.*, *p.* 295.—*Exs. Lojka Univ.*, *n.* 143.—Europe.

117. **A. cæsiolivens,** Nyl. Thallus thin, white, somewhat leprose. Apoth. livid, rounded, plane or slightly convex, thin, greyish-pruinose, within dark. Spores oblong, 4 locular, .015–17 by .0045–55 mm. Reaction dark vinous red.—*Flora* 1878, *p.* 245. *Exs. Norrl.*, *n.* 225. A note to the Sched. adds: "*A. cæsia* (*Fl.*) *Nyl. in litt.*"—Europe.

118. **A. glaucescens,** Nyl. Thallus thin, white, effuse, now bursting into mealy soredia. Apoth. blackening, rounded, plane, thinly white pruinose, surrounded by a thickish thalloid margin. Spores oblong-ovoid, 4 locular, .020–30 by .0055–9 mm. Reaction from blue vinous red.—*Nyl En.*, *p.* 357, *Tuck. Gen.*, *p.* 221 (*nomen.*) —Southern States in hb. Tuck. On oak, New Bedford, in hb. Willey. Tuckerman, l. c. notes that the spores of the northern form are larger than those of the southern.

119. **A. cinereopruinosa,** Schær. Thallus thin, white, powdery, effuse. Apoth. blackening, small, numerous, rounded or somewhat difform, plano-convex. Spores 4 (rarely 2–3–5) locular, the upper cell larger, brown or decolorate, .011–16 by .006–7 mm. Reaction vinous red. Spermatia staff-shaped, .005–6 mm. long: figured in Hepp., n. 477. (*Thrombium sticticum.*)—*En.*, *p.* 243. *Nyl. Arth.*, *p.* 94, *Scand.*, *p.* 261, *Lapp. Or.*, *p.* 187, *Kbr. Pg.*, 269, *and A. lilacina ib. fide Almq. Almq.*, *p.* 26. *A. melaleucella Nyl. Arth.*, *p.* 101, *fide Ohl. Preuss.*, *p.* 40, *and Almq. Pyrenothea litacina Fr. S. V. Sc.*, *p.* 121. *P. stictica* (*f. spermogonifera*) *Mass. Ric.*, *p.* 153.—Europe. White Mountains.

120. **A. Tuckermaniana,** n. sp. Thallus white, continuous, indeterminate. Apoth. dark reddish-brown and blackening, rounded,

somewhat convex, at first margined by the thallus, pruinose, at length naked, numerous. Spores oblong-ovoid, 4–6, commonly 5 locular, the upper cell larger, brown or decolorate, .016–23 by .005–6 mm. Reaction of the thekes vinous red.—Florida in hb. Tuck. It seems to be near *A. biformis*.

*** Spores muriform — Arthothelium.

† Apoth. pale.

121. **A. albatula,** Müll. Arg. Thallus whitish ash-colored, thin, rugose. Apoth. whitish flesh-colored, orbicular, obtusely angulose or slightly elongated, prominent, convex. Spores fusiform-ellipsoid, 8 locular, the cells three locellate, .030 by .010 mm —*Parag.*, *p.* 26. —Paraguay.

122. **A. leucocarpa,** Müll. Arg. Thallus white, thickish, rugulose. Apoth. mealy-white, hemispherical, somewhat regular. Spores 8 locular, the cells once or twice divided, .075 by .018 mm. *Socotr. p.* 13.—Socotra, Africa.

123. **A. aleurocarpa,** Nyl. Thallus thin or evanescent, glaucescent. Apoth. snow-white, mealy, superficial, slightly convex, linear or various in form. Spores ellipsoid, muriform, .100–120 by .046–50 mm. Reaction of the hymenium blue, of the thekes vinous red.—*Pr. N. Gr.*, *p.* 572.—New Grenada.

124. **A. aleurodes,** Nyl. Thallus thin, glaucescent. Apoth. white, mealy, not prominent, difform, indeterminate. Spores ellipsoid, muriform, .068–75 by .030–35 mm. Reaction of the thekes vinous red.—*Antill.*, *p.* 17.—Antilles.

125. **A. scriblitella,** Nyl. Thallus thin, white, determinate. Apoth. white, rounded, convex or depressed-pulvinate. Spores ellipsoid, muriform, .072–88 by .034–44 mm. Reaction blue.—*Pr. N. Gr.*, *p.* 102.—New Grenada. Spores figured in Edit. 1, *t.* 42, *f.* 49.

126. **A. subsimillima,** Nyl. Similar to *A. albovirens*, but the spores ellipsoid, muriform, .050–62 by .026–38 mm. Reaction blue. —*Syn. N. Caled.*, *p.* 64.—New Caledonia.

127. **A. aleurina,** Nyl. Thallus thin, white, somewhat mealy. Apoth. darkening, thinly white pruinose, minute, crowded. Spores ellipsoid, muriform, .032–35 by .020–21 mm. Reaction none.—*Pr. N. Gr.*, *p.* 102.—New Grenada.

128. **A. aphanocarpa,** Nyl., *Arth.*, *p.* 90 (*nomen.*,) belongs here, *fide Nyl. Pr. N. Gr.*, *p.* 102. Spores .046–50 by .021–26 mm. —French Guiana.

129. **A. effusa,** Müll. Arg. Thallus thin, effuse, glaucescent, minutely floccose-powdery. Apoth. white, included in thalline prominences, elongated, variously curved, and now intricately anastomose. Spores ellipsoid, muriform, .055 by .030 mm.—*Phlyctis, Beitr., n.* 219, *dein Arthothelium, ibid., n.* 279.—S. America.

†† Apoth. yellow.

130. **A. xanthocarpa,** Nyl. Thallus pale. Apoth. yellow, rounded, or rounded-difform, plane, within whitening. Spores ellipsoid, muriform, .060–74 by .025–28 mm. Reaction vinous red.—*Pr. N. Gr., p.* 102. *Exs. Lindig n.* 780, 2709.—New Grenada.

131. **A. endoxantha,** Müll. Arg. Thallus thin, white, mealy, minutely subsorediate-emergent. Apoth. orange-yellow, becoming orange brown, linear, stellate-branched, plano-convex, minutely granulate-rugose. Spores 8 locular, the cells once or twice divided, .020–25 mm. broad.—*Beitr., n.* 163.—Brazil.

††† Apoth. crimson, red or purple.

132. **A. miltina,** Kph. Thallus thin, white, effuse. Apoth. crimson, appressed or slightly prominent, irregularly rounded or oblong-lobate. Spores ovoid or ellipsoid, muriform, .034–45 by .019–22 mm.—*Born., p.* 42, *Mull. Arg. Beitr., n.* 1054.—Borneo.

133. **A. gregarina.** Willey. Thallus thin, white, effuse. Apoth. crimson, small, irregularly oblong, maculæform, and variously difform. Spores ellipsoid, muriform, .028–40 by .013–16 mm.—*Suppl., p.* 53.—Florida.

134. **A. sanguinea,** Willey. Thallus inconspicuous. Apoth. dark blood-red, superficial, suborbicular or oblong, somewhat convex, within darker. Spores ellipsoid, muriform, .022–30 by .011–14 mm. Reaction of the hymenium blue, of the spores fulvous red.—*Nyl. in Flora* 1885, *p.* 311.—California.

135. **A. purpurissata,** Nyl. Thallus thin, white, determinate, or limited by a dark line. Apoth. brownish-black, now reddening or the margin tinged with purple, oblong-difform, plane, middling-sized, within dark crimson or reddish, the hypothecium amber-purple. Spores ellipsoid or subangulose-ellipsoid, brown, 2 locular, the cells once divided, .008–9 by .007–8 mm.—*Pr. N. Gr. p.* 103.—New Grenada.

†††† Apoth. brown.

136. **A. nephelina,** Nyl. Thallus white, obscurely limited. Apoth. brown, small, irregularly oblong-difform, now confluent, the hypothecium pale. Spores ellipsoid, muriform, .050–52 by .018–25 mm. Reaction light blue.—*Pr. N. Gr. p.* 101.—New Grenada.

137. **A. leucastræa,** Tuck. Thallus effuse, white, mealy. Apoth. reddish-brown, innate, oblong and elongated, plane, at length confluent in a radiate-stellate pseudo-stroma, white pruinose, the hypothecium dark. Spores ovoid, 4 locular, the extreme cells larger, the middle ones now divided, .012–16 by .005–7 mm. Reaction vinous red.—*Gen. p.* 220.—Texas.

138. **A. chiodectoides,** Nyl. Thallus glaucescent, thin, uneven, at the circumference cottony. Apoth. livid brown, difform, convex, white pruinose, within dark. Spores ovoid-oblong, 6–8 locular, and now somewhat muriform-divided, .023–35 by .012–15 mm. Reaction from blue vinous red.—*Flora* 1869, *p.* 72.—Bengal.

139. **A. interducta,** Nyl. Similar to *A. caribæa*, but the apoth. blackening, paler when wet, crowded, somewhat dendritic-ramose, slender. Spores ovoid, 4 locular, .018–25 by .007–9 mm., but according to Tuckerman 5–7 locular, all the narrower sporoblasts broken into smaller ones, and the spores becoming thus submuriform-multilocular, the large terminal sporoblasts remaining entire. Reaction blue. *Pr. N. Gr.*, *p.* 98.—Nicaragua. Hawaii, *Tuck. Haw.*, *p.* 232.

140. **A. herpetica,** Mey. Thallus ——. Apoth. brown and blackening, orbicular or obtusely angulose, thin, plane. Spores 2 locular, the upper cell larger and entire, the lower muriform divided, .008–10 by .003–35 mm.—*Mey. Act. Leop.* 1843, *p.* —. *Mull. Arg. Revis. Mey.*, *p.* 318.—Manila.

141. **A. subvinosa,** Leight. Thallus thin, white, limited by a black line. Apoth. brown, innate or depressed, in punctiform thalline prominences, aggregated in simple divaricate-ramose or variously formed linear series. Spores obovate, muriform. Reaction of the hymenium vinous red, of the spores bluish-green.—*Ceylon*, *p.* 180 *and t.* 36 *f.* 26.—Ceylon.

142. **A. atrorufa,** Müll. Arg. Thallus greyish white, thin, rimulose. Apoth. blackish when dry, when wet reddish or reddish-brown, innate and emergent, elliptical or suborbicular, here and there confluent and somewhat branched or substellate, often sharply angulose, plane, within pale. Spores oblong ovoid, 6 locular, the cells once divided, .020–23 by .007–8 mm.—*Beitr.*, *n.* 1099.—Australia.

143. **A.** ——. Thallus white, continuous, determinate. Apoth. dark reddish brown, paler and bright red when wet, adnate, rounded, angular or difform, convex, rugulose. Spores muriform, ellipsoid, brown with age, about .038 by .015 mm. long. Reaction vinous red. —*Wright Cub.*, *n.* 503½.—Mixed in hb. Tuck. with *A. macrotheca*, from which it is distinguished by the color.

SERIES **B.** Apothecia black.

* Spores 2 rarely 3 locular.

† Apoth. rounded, more or less lecideiform.

a. Thallus glebous-squamose.

144. **A. glebosa,** Tuck. Thallus of tumid, smooth, at length plicate, fuscescent squamules. Apoth. rounded, convex, soon crowded and confluent, the hypothecium brownish-black. Spores ovoid or oblong-ovoid, 2 locular, constricted in the middle, decolorate or pale brown, .010–16 by .005–6 mm. Reaction vinous red.—*Gen.*, *p.* 221.—On mosses on rocks, California; and what seems to be the same in Colorado and Washington Territory.—*A. leucobola*, Tuck. in litt. growing on the earth in Lower California, (D. Cleveland, 1875,) seems to differ only in a paler thallus. In both the hymenium presents the appearance of regular, closely agglutinate paraphyses.

b. Thallus uniform. Plants only exceptionally parasitic.

‡ Growing on rocks, earth, or decayed vegetation.

145. **A. calcicola,** Nyl. Thallus thin, obsolescent. Apoth. superficial, rounded, convex, greyish-pruinose. Spores ovoid, simple or 2 locular, .011–13 by .005 mm. Reaction vinous red.—*Arth.*, *p.* 100, *Pr. Gall.*, *p.* 168.—On calcareous rocks, France.

146. **A. lapidicola,** Tayl. Thallus thin, dispersed, olive-brown, or becoming pale. Apoth. rounded-difform, plane, within blackening. Spores oblong-ovoid, 2 locular, .015–18 by .006–8 mm.; figured in Hepp., n. 534 Reaction from blue vinous red. Spermatia .005 mm. long.—*Hibern. II. p.* 124. *Br. and Rostr. Dan.*, *p.* 119. *A. ruderalis*, *Nyl. Arth.*, *p.* 100, *fide seipso in Flora* 1881, *p.* 535. *A. vagans v. Kærberi*, *Almq.*, *p.* 51. *Coniangium Kærberi Lahm.* (*in litt.*) *Arn. Flora* 1863, *p.* 605. *C. rupestre*, *Kbr. L. S. G.*, *n.* 110, *p. p.*, *Pg. p.* 272 *p. p. fide Almq. Catillaria fusca Mass. Ric.*, *p.* 60, *fide Nyl. Pr. Gall.*, *p.* 169. *Arthonia Hepp. Exs.*, *n.* 534, *Th. Fr. Spitz.*, *p.* 46, *Kbr. Pg.*, *p.* 272. (*Coniangium Arn. Flora* 1884, *p.* 651, who says Almq. is wrong in saying that it is the same as *Catillaria athallina.*)—*Mass. Ric.*, *p.* 80.—On calcareous rocks, Europe; and I refer here plants on limestone from Western New York, Miss Wilson, and on sandstone from Nebraska, Williams, and Illinois, J. Wolf.

147. **A. ruderella,** Nyl. Perhaps a subsp. of the preceding, differing in smaller apoth., the epithecium and hypothecium brown, the thallus dark, or ochraceous ash-colored, thin, continuous, or evanescent. Spores 2 locular, .010–14 by .0035–45 mm.—*Flora* 1881, *p.* 535.—On sandstone and calcareous rocks, France.

148. **A. adhærens,** Müll. Arg. Thallus clayey, effuse. Apoth. orbicular, hemispherical convex, rugulose, constricted at the base. Spores 2 locular, solæform, .010–13 by .0045–55 mm.—*Aeg. p.* 19. —On limestone, Egypt.

149. **A. granitophila,** Th. Fr. Thallus inconspicuous. Apoth. minute, angulate-rounded or slightly elongated, plane or slightly concave, simple or diffract, the thick hypothecium blackish-brown, and blackening. Spores ovoid-oblong, brown, 2 locular, .012–17 by .005–6 mm. Reaction vinous red. Spermatia .004–5 mm. long.—*Bot. Not.*, 1865, *p.* 39, *Almq.*, *p.* 32.—Granitic rocks, Scandinavia. Almq. l. c. is disposed to place here *Coniangium Buerianum*, *Kbr. L. S. G.*, *n.* 291, not seen by me.

150. **A. aggregata,** Wain. Thallus thin, greenish ash-colored, somewhat leprous. Apoth. angulate-rounded or subflexuous, crowded, plane, the hypothecium blackening. Spores oblong-ovoid, 2 locular, brown, .010–15 by .005–6 mm. Reaction vinous red.—*Adjum. II*, *p.* 156.—Granitic rocks, Scandinavia.

151. **A. excentrica,** Th. Fr. Thallus thick, white, glomerose-farinose. Apoth. minute, orbicular or angulose, plane or convex, scabrous, the hypothecium reddish-brown. Spores cuneate-oblong, 2 locular, .011–13 by .004–5 mm Reaction vinous red.—*Spitz.*, *p.* 46. *A. vagans f. Almq.*, *p.* 55.—On mosses, Spitzbergen and elsewhere in the Arctic regions of Europe.

152. **A. albinula,** Nyl. Thallus thin, white, granulose. Apoth. minute, irregularly rounded, within yellowish. Spores ovoid-oblong, 2 locular, .014–17 by .006–7 mm. Reaction vinous red.—*Flora* 1886, *p.* 463.—On decayed vegetation, Pyrenees.

153. **A. terrigena,** Willey. Thallus inconspicuous. Apoth. minute, rounded, lecideiform. Spores decolorate or pale-brown, ovoid-oblong, 2 locular, .011–12 by .0035 mm. Reaction of the hymenium none, of the thekes vinous red.—*Nyl. in Flora* 1885, *p.* 448.—On the earth, New Bedford, Mass.—"Not to be confounded with any other species." *Nyl. l. c.*

‡‡ On bark or dead wood.

154. **A. patellulata,** Nyl. Thallus thin, white, effuse, somewhat mealy, or obsolete. Apoth. rounded, appressed, plane, within pale, or blackening. Spores ovoid, 2 locular, .009–13 by .003–5

mm. Reaction vinous red.—*Bot. Not.* 1853, *p.* 95, *Arth.*, *p.* 102, *Scand.*, *p.* 262, *Pr. Gall.*, *p.* 168, *Almq.*, *p.* 49. *Exs. Norrl.*, *n.* 227. *Coniangium Krempelhuberi Mass. Exs.*, *n.* 57, *Kbr. Pg.*, *p.* 271. *Catillaria apatetica Mass. Symm.*, *p.* 50. (*Coniangium Kbr. Pg.*, *p.* 271 *fide Nyl. Pr. Gall.*, *p.* 168.)—Europe, United States.

Var. ulmicola, Nyl. Thallus leprous, ash-colored. Hymenium dark. Spores .009–11 by .003–5 mm.—*Ohl. Preuss.*, *p.* 41.—Europe.

Var graminea, Ohl. Hymenium dark, hypothecium pale.—*Ohl.*, *l. c.*—On dead grasses, Europe.

Var. pallidiuscula, Nyl. Apoth. paler when wet.—*Flora* 1885, *p.* 448.—On witch hazel, New Bedford.

155. ***A. nephromiaria,** Nyl. Thallus obsolete. Apoth. smaller than in *A. patellulata*, rounded, convex. Spores .009–11 by .003–4 mm. Reaction vinous red.—*Lapp. Or.*, *p.* 187.—On *Nephroma tomentosum*, Europe.

Var. Stereocaulina, Ohl. On *Stereocaulon condensatum*, and *Physcia parietina*. Spores .010–15 by .003–5 mm.—*Ohl. l. c.*—Europe.

156. **A. pandanicola,** Nyl. *Arth.*, *p.* 103, (*nomen.*,) *Exot.*, *p.* 246, (*descr.*) *Kph. Novara*, *p.* 108.—Polynesia.—From its place in *Arth.* seems to belong in this section.

157. **A. Alexandrina,** Nyl. Thallus whitish or greenish ash-colored, thin, effuse, somewhat granulose. Apoth. rounded, lecideiform, plane, often crowded, within dark. Spores ovoid, 2-locular, .008–9 by .003–35 mm. Reaction vinous red.—*Flora* 1876, *p.* 285. —Egypt.

158. **A. betuleti,** Nyl. Akin to *A. patellulata*. Apoth. brownish-black, rounded-difform, depressed, plane or convex. Spores 2 locular, .011–14 by .004–5 mm.—*Flora* 1877, *p.* 568. *A. vagans var. Almq. A. exilis var. connectens Wain. Adjum. II*, *p.* 162.

159. **A. tenellula,** Nyl. Thallus obsolete. Apoth. very minute, rounded, depressed-convex, the hypothecium dark. Spores ovoid or oblong, 2 locular, .009–14 by .004–5 mm. Reaction vinous red.—*Flora* 1864, *p.* 488. *A. fomentaria*, *Nyl. Flora* 1875, *p.* 448, (growing on *Polyporum fomentarium*, the spores .008–10 by .0035–45 mm.) *A. exilis var. Wain. l. c.*, *p.* 161. *A. vagans v. Kœrberi Almq.*, *p.* 51. *Patellaria dryina Dub. Bot. Gall.*, *p.* 650, *fide Nyl. Flora* 1882, *p.* 456. *A. dryina f. salicicola Nyl. Flora* 1877, *p.* 568. *Exs.* (*A. dryina*) Lojka Hung., n. 174, *Norrl.*, *n.* 228.—Europe.

160. **A. dispuncta,** Nyl. Thallus ash-colored, thin, rugulose, effuse. Apoth. brownish-black and blackening, rounded, depressed, adnate, within dark. Spores oblong-ovoid, 2 locular, .010–15 by

.003–4 mm. Reaction purplish-red.—*Flora* 1876, *p.* 575. *A. exilis var. Wain l. c., p.* 163. *A. vagans v. apatetica Almq., p.* 52. *Exs. Norrl. n.* 229, *Lojka Univ., n.* 242.—Europe.

161. **A. melaspermella,** Nyl. Thallus white, effuse or obsolete. Apoth. black or brownish-black, rounded, lecideiform, small, plane, with a subcrenulate at length evanescent margin. Spores oblong-ovoid, 2 locular, brown, .0003–45 by .00012–14 inch. Reaction blue. —*Flora* 1865, *p.* 605, *Leight Gr. Brit., p.* 392, *Lindsay Jour. Linn. Soc.*, 1866, *p.* 268 *and t.* 6. The note of Nyl. on the species in the *Journal* for the same year, *p.* 341, I have not seen.—England.

162. **A. microsperma,** Nyl. Thallus pale green. Apoth. rounded, plano-convex, rugose, within dark. Spores solæform, 2 locular, .009–11 by .003–4 mm.—*En., p* 133 (*nomen.*) *Mull. Arg. Beitr., n.* 1092. *Lecidea complanata Fée Ess., p.* 112, *Suppl., p.* 103, *fide Mull. Arg. Graph. Fée. p.* 57.—Tropical.

163. **A. microspermoides,** Nyl. Thallus thin, white, indeterminate. Apoth. rounded or rounded-oblong, plane, within dark. Spores ovoid, 2–3 locular, .009–10 by .003–4 mm. Reaction when present blue.—*Pr. N. Gr., p.* 107.—Java.

164. **A. convexella,** Nyl. Thallus thin, ashy-green or evanescent. Apoth. rounded, spherical, minute, convex, rugulose. Spores oblong-ovoid, 2 locular, brown or decolorate, .012–15 by .004 mm. Reaction vinous red.—*Pr. Gall., p.* 169. *Lamy, n.* 565. *A. vagans var.* 11. *Almq., p.* 54.—On dead wood, France.

165. **A. epimela,** Norm. Thallus at length thick, dark. Apoth. minute, orbicular, convex, scabrous. Spores ovoid or oblong, 2 locular, .009–13 by .0035–45 mm. Spermatia .004–5 mm. long.—*Bot. Not.* 1872, *p.* 34. (*nomen.,*) *Almq., p.* 56.—Scandinavia.

166. **A. rugulosa,** (Kph.) Almq. Thallus thin, scaly, dark. Apoth. minute, shining, paler when wet, the hypothecium black. Spores 2 locular, .012–15 by .006–7 mm.; figured in Hepp., n. 472, 473 *fide Almq.* Reaction from blue vinous red.—*Coniangium Kph. in litt., Kbr. Pg. p.* 271, *Almq., p.* 55.—Germany.

167. **A. horaria,** Norm. Thallus inconspicuous or at length efflorescent, dark. Apoth. adnate, rounded or a little difform, plane or convex, rugulose. Spores ellipsoid or oblong, 2 locular, constricted, .012–18 mm. long. Reaction purplish, as also of the hyphæ.—*Norveg.* 1884, *p.* 33.—Norway.

168. **A. exilis,** (Flk.) Thallus inconspicuous or obsolete. Apoth. very minute, subglobose. Spores solæform, .006–9 by .003–4 mm —*Lecidea synothea v. exilis Flk. D. L., n.* 187. *L. exilis Nyl. Pr. Gall., p.* 187. *Arthonia Anz. Sond., p.* 94. *Wain.*

Adjum. II, p. 160 (*excl. syn.*) *A. vagans var. Almq. p.* 53. *Coniangium Arn. Flora* 1884, *p.* 410. *Abrothallus Mass. Ric., p.* 88. —Europe: and Nyl. has referred here a plant only found once, on dead wood, New Bedford. *Exs. Norrl., n.* 230.—The variety of opinions respecting this plant and its congeners illustrates the difficulty of coming to harmonious conclusions about organisms so much alike. Wain. refers here *A. lapidicola, apatetica, tenellula, dryina. betuleti, dispuncta*, and *vagans*, and Arnold *A. vagans, apatetica* and *rugulosa*.

Var. inundata, Wain. Apoth. very minute, rounded, convex, the hypothecium dark. Spores .009–11 by .003–4 mm. Reaction vinous red.—*Adjum. II, p.* 162.—*On Lecidea* (*Biatora*) *inundata* and granitic rocks, Scandinavia.

169. **A. copromya,** Anz. Description not seen. According to Almq., p. 34, it resembles *A. mediella*. Epithecium granulose, hypothecium orange-brown. Spores 2 locular, acute, .0016–17 by .006 mm.—*Buellia Anz. Long., n.* 341. *Arthonia ibid. Comm. Soc. Critt. Ital.* 1864, *p.* 21. *A. myocoprodes Nyl. in litt. fide Stitz. Helv., n.* 1088. Not *A. copromya Trev. Venet., n.* 254, *fide Kph. Gesch. III, p.* 228.—*Buellia mughorum, Anz. Lang., n.* 342, *Comm. l. c., p.* 19, is in a specimen sent me under this name an Arthonia of this stock, with minute, rounded, plane apoth., and 2 locular, constricted, brown spores, .018–22 by .009–11 mm., the hypothecium pale, reaction vinous red.

170. **A. lividofusca,** Müll. Arg. Thallus thin, effuse, olive-green. Apoth. orbicular or now angulose, when dry blueish-black, plane, when wet livid-fuscescent, convex. Spores narrowly obovoid, 2 locular, .009–11 by .003 mm.—*Beitr., n.* 306.—On leaves, Brazil.

171. **A. Myristicæ,** Müll. Arg. Thallus thin, effuse, olive-brown. Apoth. obtusely angulose or orbicular, when dry brownish-black, when wet brown. Spores clavate obovoid, 3 locular, .009–13 by .004 mm —*Beitr., n.* 305.—On leaves, Phillipine Islands.

172. **A. trilocularis,** Müll. Arg. Thallus inconspicuous, olivaceous. Apoth. angulose-orbicular, black or brownish-black, depressed-concave, within dark. Spores cylindrical-obovoid, 2–3 locular, .010–12 by .004 mm.—*Beitr., n.* 304.—On leaves, Madagascar.

173. **A. aciniformis,** Stirt. *Lich. on Leaves, p.* 7.

174. **A. accolens,** Stirt., *l. c. p.* 7.—I know these two lichens only by the reference to them by Müll. Arg. *Beitr., n.* 304, 305, 306, as of the same stock of those there described.

175. **A. biseptella,** Nyl. ined. Thallus inconspicuous. Apoth. adnate, rounded or slightly angulose or oblong. Spores oblong, 3 locular, .007–9 by .003–4 mm.—Cuba in hb. Tuck.

176. **A.** ——. Thallus thin, white, bordered by a black line. Apoth. adnate, rounded or elliptical, convex, within pale. Spores oblong-ovoid, 2 locular, .016–25 by .008–9 mm. Reaction vinous red.—On dead wood, Cuba, in hb. Tuck. *Exs. Wright Cub., n.* 211.

177. **A.** ——. Thallus very thin, white. Apoth. very minute, punctiform, rounded. Spores ovoid, 2 locular, .019–23 by .009–11 mm.—Cuba in hb. Tuck., marked "unique." I have only a very small fragment.

178. **A.** ——. Thallus thin, pale yellow, determinate, limited by a black line. Apoth. adnate, rounded, angulose or a little elongated, plane, within pale. Spores oblong-ovoid, constricted, brown, .029–46 by .010–16 mm. Reaction light blue.—Port Famine, Straits of Magellan, Hassler, Exp. Sent to Nyl. as No. 15.

179. **A.** ——. Thallus thin, white, indeterminate. Apoth. minute, rounded or a little oblong or angular, convex. Spores ovoid or ellipsoid, the ends rounded, more or less constricted in the middle, 2 locular, .018–23 by .009 mm.—*Wright Cub., n.* 211.

†† Apoth. more or less elongated, stellate or irregular.

180. **A. dispersa,** (Schrad.) Nyl. Thallus thin, white, effuse or obsolete. Apoth. lirellæform, simple or sparingly branched. Spores ovoid-oblong, 2 locular, .010–15 by .004–5 mm.; figured in Hepp., n. 343. Reaction blue.—*Opegrapha Schrad. Exs., n.* 167. *Arthonia Nyt. Scand., p.* 261, (*non Arth., p.* 93,) *Flora* 1873, *p.* 267, *Almq., p.* 43. *A. minutula Nyl. Arth., p.* 102, *Pr. Gall., p.* 169. *Exs. Norrl., n.* 47. *Lichen epipastus Ach. Pr., p.* 23, *L. diasporus ibid, p.* 228, *and Opegrapha epipasta ibid, p.* 26. *Syn., p.* 25, *fide Almq. l. c.* But "*A. epipasta Ach.*" *Leight Gr. Brit., p.* 397, is described as having dark brown apoth., and 4 locular spores, twice the size of those of *A. radiata;* and "*A. epipasta Ach.*" *Kbr. Syst., p.* 292, *Pg.* 266, as having 2–4 locular spores, and the place of these two seems to be elsewhere.—Europe, United States.

f. Rhododendri, Arn. *Flora* 1872, *p.* 152, is a *Melaspilea* near *M. proximella, fide Almq., p.* 44.

181. **A. cytisi,** Mass. Thallus inconspicuous. Apoth. lirellæform, stouter than in the preceding, mostly hollowed with elevated margins, aggregated or confluent in substellate heaps. Spores oblong-ovoid, 2 locular, .012–18 by .003–6 mm. Reaction blue.—*Mem., p.* 114, *Almq., p.* 44. *A. dispersa Mass. Ric., p.* 51 *and f.*

95. *A. astroidea f. Cembræ Anz. Lang.*, *n.* 463, 467, *fide Almq. Stitz. Heb.*, *n.* 1103: but Arn. in *Flora* 1881, *p.* 203, says this last has the spores of *A. astroidea*, and is hardly entitled to a separate name.—Italy.

182. **A. excipienda.** Nyl. Apoth. stouter than in *A. dispersa*, less frequently branched. Spores 2 locular, .014–19 by .006–7 mm. Reaction vinous red.—*Scand.*, *p.* 261, *Almq.* *p.* 45.—Scandinavia.

183. **A. dispersula,** Nyl. Similar to *A. dispersa*. Apoth. somewhat oblong-lanceolate, or obsoletely abbreviate-angulose, sometimes decolorate or pallescent. Spores 2 locular, .008–11 by .003–4 mm. Spermatia slightly bowed, .006 mm. long.—*Flora* 1876, *p.* 285.—Egypt.

184. **A. subdispersa,** Nyl. in Müll. Arg. *Sched. Graph. Cub. and Wright Cub.*, *n.* 145.—Not in my collection: n. 281 of this collection has 2 locular spores, .009–13 by .004–6 mm.: whether the same I do not know.

185. **A. subdispersula,** Nyl. Thallus white or yellowish white, determinate, limited by a black line. Apoth. small, linear, simple or abbreviate-ramose. Spores solæform, 2 locular, brown, .009–11 by .0035–55 mm.—*Nyl. in litt.*—Port Famine, Straits of Magellan, Hassler Exp. Sent to Nyl. under n. 14.

186. **A. aspersella,** Leight. Thallus pale yellowish, effuse. Apoth. very minute, scattered, punctiform, linear or angular-confluent. Spores obovate, 2 locular.—*Grevillea* 1872, *p.* 60, *and t.* 4 *f.* 4.—On holly, Wales.

187. **A. subminutula,** Nyl. Thallus inconspicuous. Apoth. slender, stellate ramose, uneven. Spores ovoid, 2 locular, .011–15 by .004–5 mm. Reaction vinous red.—*Flora* 1885, *p.* 312.—On white pine, New Bedford, very rare.

188. **A. tædescens,** Nyl. Thallus inconspicuous. Apoth. innate, elongated, simple, or stellate-branched. Spores fusiform-ovoid, 2 locular, .019–27 by .007–9 mm.—*Nyl. in hb. Tuck.*—Alabama. Florida, hb. Calkins.

189. **A. Hibernica,** Nyl. Perhaps a subsp. of *A. excipienda*, but the spores larger, .016–21 by .006–8 mm.—*Flora* 1876, *p.* 237. —Ireland: and Nyl. has referred here provisionally plants from the United States.—The plant sent Nyl. was from Florida in hb. Eckfeldt, with spores .016–18 by .007–9. Illinois plants have the spores .016–23 by .008–9, or even .023–29 by .013 mm.; and similar plants have been collected in New York and Massachusetts.

190. **A. minutissima,** Nyl. Thallus inconspicuous. Apoth. very minute, punctiform-rounded or rounded-oblong. Spores ovoid, 2 locular, .011 by .006 mm. Reaction blue.—*Scand.*, *p.* 263.—A very rare and insufficiently observed plant of northern Europe.

191. **A. subminutissima,** Nyl. Thallus inconspicuous. Apoth. minute, rounded or oblong. Spores oblong-ovoid, 2 locular, .007–9 by .003 mm. Reaction dark vinous red.—*Flora* 1885, *p.* 448.—On branches of pitch pine, New Bedford.

192. **A. galactites,** (DC.) Duf. Thallus thin, white. Apoth. rounded or oblong, within pale. Spores ovoid-oblong, 2 locular, .010–15 by .004–5 mm. Reaction from blue vinous red. Spermatia needle-shaped, bowed, .012–16 mm. long; figured in Hepp., n. 559. —*Verrucaria DC. Fl. Fr. II, p.* 315. *Duf. Jour. Phys.* 1818, *p.* 5. *Nyl. Arth.*, *p.* 101, *Flora* 1873, *p.* 207. *Kbr. Pg.*, *p.* 315. *Almq.*, *p.* 45. *A. punctiformis b. galactina Ach. Syn.*, *p.* 4. *A. punctiformis Mass. Ric.*, *p.* 50, *fide Arn. Flora* 1887, *p.* 160.—Europe.

Var. depmeta, Nyl. Apoth. smaller and more scattered. Spores .011–16 by .004–6 mm.—*Flora* 1873, *p.* 207.—Pyrenees.

f. galactites, Bagl. Apoth. plane, rounded or oblong-difform, the epithecium olive-brown. Spores .009–12 by .003 mm. Reaction from blue vinous red. Spermatia bowed, .009–12 mm. long.—*Comm. Soc. Critt. Ital. I, p* 39. *Arn. Flora* 1887, *p.* 160.—Europe.

193. **A. cæsiella,** Nyl. Thallus thin, white. Apoth. small, erumpent, lanceolate-oblong or irregular, greyish pruinose. Spores ovoid, 2 locular, .016 by .007 mm. Reaction blue.—*Arth.*, *p.* 101, *Pr. Gall.*, *p.* 169.—France.

194. **A. marginella,** Duf. Thallus inconspicuous. Apoth. minute, appressed, scattered, plane, discoid, with a thin naked margin. Spores ovoid, 2 locular, .011–14 by .005–6 mm. Reaction from blue vinous red.—*Nyl. Arth.*, *p.* 100.—Europe.

195. **A. faginea,** Müll. Arg. Thallus inconspicuous. Apoth. crowded, orbicular or angulose, macular-deplanate, within pale. Spores solæform, 3 locular, .015–17 by .0055–65 mm.—*Beitr.*, *n.* 966.—Switzerland.

196. **A. myriadea,** (Fée) Nyl. Thallus white, somewhat mealy. Apoth. punctiform, irregular, scattered or crowded, emergent, when dry ashy-brown, when wet very black. Spores unknown.—*Coniocarpon Fée Ess.*, *p.* 99 *and t.* 15 *f.* 5. *Nyl. Arth.*, *p.* 101, where it is placed with the plants having 2 locular spores. *Mull. Arg. Graph. Fée. p.* 57.—Tropical in hb. Fée.

197. **A. microspermella,** n. sp. Thallus thin, white, effuse. Apoth. minute, numerous, briefly elongated, and more or less

branched, or angular-difform. Spores ovoid, (2)–3 locular, .009–13 by .0035–55 mm. Reaction vinous red. Spermatia .004 mm. long. —Galveston, Texas, in hb. Tuck.—The plant has much the aspect of *A. myriadea* as figured by Fée, *Ess. t.* 15, *f.* 5.

††† Parasitic. Spores 2 locular.

198. **A. apotheciorum,** (Mass.) Almq. Parasitic on apoth. of *Lecanora albescens*. Apoth. very minute, maculæform, innate, often confluent, the hypothecium pale. Spores oblong, 2 locular, .011–15 by .004–6 mm. Reaction vinous red. Spermatia .005–7 mm. long. *Almq., p.* 58.—*Sphæria Mass. Ric., p.* 26 *and f.* 41. *Coniocarpon ibid. Misc., p.* 16. *Conida subvarians var. Arn. Flora* 1874, *p.* 105.—Europe.

199. **A. cœrulescens,** Almq. Similar to the preceding, but the epithecium dark blue. Spores .010–12 by .004–6 mm. Reaction blue. *Almq., p.* 59.—Parasitic on apoth. of *Lecanoria varia*, Scandinavia.

200. **A. oxyspora,** Almq. Parasitic on apoth. of *Lecidea vorticosa*, exhibiting, with the addition of iodine, a bluish or vinous red grumose mass. Spores ovoid-lanceolate, 2 locular, .010–14 by .0035–4 mm.—*Almq., p.* 62.—Scandinavia.

201. **A. amylospora,** Almq. Parasitic on a sterile crust. Apoth. very minute, rounded or angulate, innate, plane, scabrous, the hypothecium dark. Spores ovoid-oblong, 2 locular, .018–24 by .008–10 mm. Reaction vinous red.—*Almq., p.* 48.—Scandinavia.

202. **A. neglectula,** Nyl. Thallus leprous, white. Apoth. rounded, plane or convex, within amber-orange-colored, the hypothecium becoming brownish-black, the hymenium violet with potash. Spores ovoid, 2 locular, .007–10 by .003–35 mm. Reaction vinous red.—*Flora* 1874, *p.* 13. *Wain. Adjum. II, p.* 154; *non Almq., p.* 33, which is the following. According to Wain. the thallus described by Nyl. is foreign, and the apoth. are parasitic on the thallus and apoth. of *Bæomyces carneus Nyl.*—Scandinavia.

203. **A. Almquistii,** Nyl. Apoth. very minute, rounded, plane, scabrous, within pale, the hypothecium pale, the hymenium not violet with potash. Spores oblong, 2 locular, .010–15 by .003–4 mm. Reaction vinous red. Spermatia .003–4 mm. long.—*Wain. Adjum. II, p.* 156, who says it is too near *A. exilis*. *A. neglectula Almq., p.* 33.—Parasitic on a sterile crust.—Scandinavia.

204. **A. Peltigerea,** Th. Fr. Parasitic on *Peltigera canina* and *Solorina saccata*. Apoth. large, orbicular, appressed, convex, the hypothecium thick, blackish-brown, the paraphyses thick, distinct,

parallel. Spores oblong or oblong ovoid, 2 locular, .015–21 by .0065–8 mm. Reaction vinous red.—*Bot. Not.* 1866, *p.* 15, *Almq.*, *p.* 49.—Scandinavia.

205. **A. punctella,** Nyl. Parasitic on *Buellia alboatra*. Apoth. very minute, punctiform, suborbicular, innate, plane, the hypothecium dark. Spores ovoid, 2 locular, at length brown, .005 by .007 mm. Reaction blue.—*Nyl. in Carrol, contrib. to Irish Lich.* 1859, *p.* 10, *Almq.*, *p.* 48. *Leight. Gr. Brit.*, *p.* 403. *Conida Arn. Flora* 1874, *p.* 105.—Ireland.

206. **A. clemens,** (Tul.) Nyl. Parasitic on apoth. of *Lecanora rubina* and other lichens. Apoth. very minute, suborbicular, prominent, within pale. Spores clavate-ovoid, 2 locular, .010–12 by .004–5 mm. Reaction vinous red. Spermatia .004 mm. long.—*Phacopsis Tul. Mem.*, *p.* 124. *Nyl. Flora* 1873, *p.* 74, *Almq.*, *p.* 57. *Conida Arn. Flora* 1874, *p.* 104, *Kbr. Pg.*, *p.* 458, *p. p.*—Europe. Arctic N. Am. *fide Th. Fr. Eng. Polar Exp.*, *p.* 369.

207. **A. subvarians,** Nyl. Distinguished from the preceding by simply ovoid-oblong spores, the upper part less thickened.—*Flora* 1868, *p.* 345. 1873, *p.* 74, *Lamy*, *n.* 564, *Zw. Heid.*, *n.* 479. *A. apotheciorum Almq.*, *p.* 58. *Conida Arn. Flora*, 1874, *p.* 104.—Europe, on thallus of various species of *Lecanora*.

208. **A. circinata,** Th. Fr. Parasitic on *Umbilicaria vellea* and *U. spodochroa*. Apoth. minute, circularly arranged, convex, the epithecium granulose, the hypothecium pale. Spores oblong, 2 locular, .013–15 by .005–6 mm. Reaction vinous red. Spermatia .005–7 mm. long.—*Bot. Not.* 1865, *p.* 100, *Almq.*, *p.* 56.—Scandinavia.

209. **A. Pelveti,** (Hepp.) Almq. Parasitic on *Peltigera polydactyla* and *Sticta aurata*. Apoth. maculæform, crowded, confluent, within reddish. Reaction vinous red. Spores oblong-ovoid, 2 locular, .009–13 by .004–5 mm.; figured in Hepp, n. 372, 589, *Celidium, Hepp Exs.*, *n.* 589, *Almq.*, *p.* 57. *Conida Arn. Flora* 1874, *p.* 105.—Europe.

210. **A. epiphyscia,** Nyl. Parasitic on *Physcia cæsia*. Apoth. small, convex. Spores grape-seed shaped, 2 locular, .011–12 by .0045 mm. Reaction vinous red.—*Flora* 1875, *p.* 361. *Conida Arn. Flora* 1877, *p.* 300.—Finland.

211. **A. stictaria,** Nyl. Parasitic on *Sticta aurata*. Apoth. brown or brownish-black, rounded, convex. Spores oblong, 2 locular, .009–10 by .0035–45 mm. Reaction vinous red.—*Flora* 1867, *p.* 440, *N. Zeal.* (1888,) *p.* 123.—New Zealand. Madeira Isl., *Stitz. Mader.*, *p* 11.

212. **A. subconveniens,** Nyl. Parasitic on *Sticta dissecta*. Similar to the preceding, but the spores .014–15 by .004 mm.—*Flora* 1867, *p.* 440, *N. Zeal.* (1888,) *p.* 124. The original description not seen.—Brazil.

213. **A. Ricasoliæ,** Müll. Arg. Parasitic on *Sticta Hartmanni*. Apoth. orbicular, slightly convex, olive-black, and brown, at length emergent, confluent. Spores solæform, 2 locular, .011–15 by .003 mm.—*Beitr., n.* 1196. *Shirley* 1889, *p.* 150.—Australia.

214. **A. destruens,** (Rehm.) Rab. Parasitic on *Theloschistes parietinus*. No description seen. Spores 2 locular, .009–15 by .003–5 mm.—*Exs. Rab., n.* 816. *Conida Arn. Flora* 1874, *p.* 105. —Europe.

f. maculans, Rehm.—*Conida Arn. l. c.*

[**A. vagans.** Almq., p. 50, is a composite species including *A. lapidicola* and its synonyms, *A. exilis*, *A. excentrica*, and as subspecies *A. rugulosa*, *A. epimela*, *A. circinata*, and *A. Pelveti*, and the following varieties:

Var. lecanorina, Almq. Parasitic on apoth. of *Lecanora albella*. Apoth. very minute, innate. Spores .009–10 by .004–5 mm. Reaction blue or vinous red.—*P.* 54.—Scandinavia.

Var. peltigerina, Almq. Parasitic on *Peltigera canina* and *Solorina crocea*. Apoth. very minute, convex or subglobose, the hypothecium dark. Spores oblong, .013–18 by .005–6 mm. Spermatia .004–5 mm. long.—*P.* 54.—Scandinavia.

Var. 11. Parasitic on a *Lecanora* (?*Hageni.*) Apoth. very minute, subglobose, the hypothecium dark. Spores oblong, .014–20 by .005–6 mm. Reaction blue.—*P.* 55, where it is called partly the same as *A. convexella Nyl. Bot. Not.* 1865, *p.* 100, but uncertainty is expressed whether it is the same as *A. convexella Nyl. Pr. Gall.*, *p.* 169.—Scandinavia.

Var. macularis, Almq. Thallus smooth, white. Apoth. very minute, maculæform, often irregular, almost innate, within dark. Spores oblong. Reaction vinous red.—*P.* 52.—On bark, Scandinavia.

Var. apatetica, (Mass.) Almq. Thallus ash colored, leprose. Apoth. minute, convex, within dark.—*P.* 52. Catillaria *Mass. Symm., p.* 50. *Coniangium Kbr. Pg. p.* 271. *A. patellulata Nyl. Pr. Gall., p.* 168. *A. exilis Wain. II, p.* 160.—Europe.]

** Spores 4–8 locular.

† Apoth. rounded or oblong, angular or difform.

‡ On rocks.

215. **A. trachylioides,** Nyl. Thallus white, powdery. Apoth. superficial, rounded-difform, convex, within dark. Spores ovoid, 2–4 locular, .010–14 by .004–5 mm. Reaction vinous red.—*Arth.*, *p.* 99. *A. lecideoides Th. Fr. Gen. Heterol.*, *p.* 97, *Almq.*, *p.* 31. *Lecidea arthonioides Ach. Syn.*, *p.* 24. *Trachylia Fr. L. E.*, *p.* 403. *Kbr. Syst.*, *p.* 300, *Mass. Mem.*, *p.* 117.—Rocks, and rarely on bark.—Europe.

216. **A. petrensis,** Nyl. Thallus thin, white, uneven, rimulose. Apoth. brownish-black and blackening, rounded oblong, convex, now confluent, within pale. Spores ovoid, 4 locular, .014–16 by .005–6 mm. Reaction blue.—*Flora* 1876, *p.* 309.—Silicious rocks, Hungary.

217. **A. myriocarpella,** Nyl. Thallus greyish or ash-colored, subareolate or somewhat powdery, effuse, or evanescent. Apoth. brownish black and black, superficial, minute, rounded, plane or convex, within dark. Spores oblong-ovoid, 4 locular, .010–12 by .003–35 mm.—*Pr. N. Gr.*, *p.* 107.—On mica schist, Ireland.

218. **A. psimmythodes,** Nyl. Thallus thin, somewhat scattered. Apoth. minute, maculæform, rounded-subangulose, plane, within pale. Spores oblong-ovoid, 4 locular, .015–18 by .006 mm. Reaction from blue vinous red.—*Flora* 1881, *p.* 534. *Exs. Lojka L. U.*, *n.* 175 *bis*.—On sandstone, Hungary.

219. **A. serialis,** Müll. Arg. Thallus white and yellowish-white, smooth or glebous-rugulose. Apoth. orbicular, and subangulose, often serially disposed, and then spuriously substellate, plano-convex, greyish-pruinose, torn at the circumference. Spores ovoid or oblong ovoid, 2–4 locular, the upper cell larger, .011–14 by .005–6 mm.—*Beitr.*, *n.* 1449, (*non Graph. Fée. p.* 56.)—On rocks, Brazil.

‡‡ On bark or dead wood.

220. **A. mediella,** Nyl. Thallus inconspicuous. Apoth. minute, orbicular, convex, within dark. Spores oblong or fusiform-ovoid, 2–4 locular, .012–17 by .004–6 mm.; figured in Hepp., n. 509. Reaction vinous red. Spermatia .005–6 mm. long.—*Scand.*, *p.* 259, *Lapp. Or.*, *p.* 167, *Almq.*, *p.* 30, *Wain. II*, *p.* 155. *A. trabinella Th. Fr. Arct.*, *p.* 240. *A. muscigínea Th. Fr. Bot. Not.* 1865, *p.* 182, *p. p. A. sordaria Kbr. Pg.*, *p.* 269, *fide Almq. Biatora globulosæformis Hepp. Exs.*, *n.* 509, *fide Mull. Arg. Geneve*, *p.* 71,

Almq. l. c. Exs. Lojka Hungar., *n.* 169, *Norrl.*, *n.* 226.—Northern Europe. Greenland, *fide Br. and Gronl., Greenland*, *p.* 508.

221. **A. marmorata,** (Ach.) Nyl. Thallus thin, white, leprose. Apoth. oblong-difform or somewhat lobate, appressed, plane, within dark. Spores ovoid, 4 locular, brown, .012–15 by .0045–55 mm. Reaction blue.—*Spiloma Ach. hb. Nyl. Scand.*, *p.* 258. *Spiloma melaleucum var. leucopellæum Ach. L. U.*, *p.* 138. *A. leucopellæa Almq.*, *p.* 28. *A. Schæreri Mass. Symm.*, *p.* 68, *fide Almq. A. cinereopruinosa v. lobata Nyl. Arth.*, *p.* 94, *Pr. Gall.*, 165. *Trachylia melaleuca Fr. Exs.*, *n.* 23. *Exs. Norrl.*, *n.* 46.—Europe.

222. **A. chroolepida,** Nyl. Thallus yellowish-white, somewhat mealy. Apoth. sanguineous-black, superficial, oblong-difform, convex, within dark. Spores oblong-ovoid, 4 locular, .009–13 by .003–4 mm. Reaction dark vinous red.—*Flora* 1873, *p.* 22. On dead wood, Scandinavia.

223. **A. tabidula,** Anz. Description not seen, but akin to the preceding, *fide Almq.*, *p.* 31.—*Anal.*, *p.* 19.—Italy.

224. **A. hypobela,** Nyl. Thallus thin, white. Apoth. minute, rounded or a little oblong, slightly prominent. Spores oblong, narrowed below, and at length acuminate, 4–6 locular, .030–38 by .005 mm.—Reaction from blue tawny red.—*Flora* 1876, *p.* 576.—On pinus sylvestris, France.

225. **A. caudata,** Willey. Thallus white or inconspicuous. Apoth. appressed, minute, rounded or oblong. Spores oblong, attenuate below, 6–8 locular, .027–36 by .005–7 mm. Reaction blue. —*Suppl.*, *p.* 54.—On white pine, New Bedford. Perhaps not different from the preceding.

226. **A. lurido-alba,** Nyl. Thallus inconspicuous. Apoth. rounded or oblong, lurid-black, greyish pruinose, the hypothecium dark. Spores ovoid, 4 locular, .014 by .006 mm. Reaction vinous red.—*Tuck. Gen.*, *p.* 222 (nomen.)—White Mountains in hb. Tuck.

227. **A. diffusa,** Nyl. Thallus thin, white effuse, or obsolete. Apoth. scattered, rounded or difform, plane or convex, naked or whitish pruinose, within pale. Spores oblong-ovoid, 4 locular, .009–13 by .0035–45 mm. Reaction blue. Spermatia oblong.— *En. p.* 337 (*nomen.*) *Flora* 1885, *p.* 448. *A. Willeyi, Tuck. in litt.* —Northern, Middle, and Western States east of the Mississippi.

228. **A. subdiffusa,** n. sp. Thallus, white, effuse, somewhat mealy. Apoth. minute, rounded or a little oblong or angular, adnate, plane or a little convex. Spores narrowly oblong-ovoid, 4 locular, .012–16 by .0035–40 mm. Reaction of the thekes vinous red. —Florida, Austin in hb. Tuck.

229. **A. melaspora,** Tuck. Thallus white, effuse, powdery. Apoth. innate, rounded, oblong or difform, plane, suffused with the thallus. Spores oblong-ovoid, 4–6 locular, the upper cell largest, very dark brown and almost black, .022–27 by .010–13 mm. Reaction blue.—*Tuck. in hb. Sprague. Willey Suppl*, *p.* 54.—On dead wood, Florida, Miss Wilson.

230. **A. aspersa,** Leight. Thallus greyish-green, thin, indeterminate. Apoth. numerous, rounded and variously difform, depressed or plane, within dark. Spores ovoid-oblong, 4 locular, .013–15 by .006 mm., the upper cell largest. Reaction blue.—*Ann. Nat. Hist.*, 1856, *p.* 332 *and t.* 11 *f.* 11–15, *Gr. Brit.*, *p.* 395, *Almq.*, *p.* 41.—Europe.

231. **A. pinastri,** Anz. Thallus inconspicuous. Apoth. innate, rounded or oblong, appressed, plane or convex, greyish pruinose. Spores ——.—*Comm. Soc. Critt. Ital.* 1862, *p.* 159, *exs. Etr.*, *n.* 34. *A. neglecta Bagl. in Rab. Exs.*, *n.* 670, *fide Almq.*, *p.* 63.—On pine, Italy; and Nyl. has referred here provisionally a plant on white pine, New Bedford, in which the spores are 4 locular, .016–22 by .006–9 mm.

232. **A. reniformis,** (Pers.) Ach. "Thallus olivaceous. Apoth. subreniform."—*Opegrapha Pers. Ann.* 1794, *p.* 31. *Arthonia Ach. L. U.*, *p.* 146, *Nyl. Flora* 1867, *p.* 330. *Arn. Flora* 1884, *p.* 647, *Lamy*, *p.* 152. *A. obscura* (*Pers.*) *Ach. L. U.*, *p.* 146, *in Hepp Exs.*, *n.* 897, *fide Stitz. Helv.*, *n.* 1095. The spores of Hepp's plant are 6 locular, .013–20 by .003–4 mm.—Nyl. has referred here a plant on white pine, Pennsylvania, in hb. Eckfeldt, in which the thallus is thin, white, the apoth. appressed, rounded or oblong; spores 6 locular, .018–23 by .006–8 mm.

233. **A. gyrosa,** Ach. Thallus inconspicuous, limited by a dark line. Apoth. appressed, crowded, difform, obsoletely gyrose rugose. Spores ovoid, 6–(8) locular, .013–17 by .005–6 mm. Reaction yellow.—*L. U.*, *p.* 144, *Syn.*, *p.* 5, *Nyl. Arth.*, *p.* 96, *Mass. Ric.*, *p.* 51.—Europe.

234. **A. subgyrosa,** Nyl. Thallus thin, white. Apoth. depressed, rounded or difform, somewhat gyrose-insculpted or rugose and torn, within dark. Spores oblong-ovoid, 4 locular, .015 by .006 mm. Reaction from blue vinous red.—*Flora* 1869, *p.* 72.—Bengal.

235. **A. glaucella,** Nyl. Thallus thin, white. Apoth. crowded, small, difform, macular, uneven, plane, the older ones lobate-disjoined, thinly grey-pruinose. Spores oblong, .016–18 by .005–6 mm. Reaction blue.—*Arth.*, *p.* 97.—Germany.

236. **A. viburnea,** Müll. Arg. Thallus inconspicuous. Apoth. suborbicular, depressed-hemispherical, the hypothecium pale. Spores oblong-ovoid, 6 locular, .015–18 by .0045–6 mm.—*Beitr.*, *n.* 967.—Switzerland.

237. **A. ilicina,** Tayl. Thallus white, determinate. Apoth. brownish-black, scattered, irregularly rounded, oblong or difform, within pale. Spores club shaped, 6 locular, at length brown, the upper cell largest, .030 by .012 mm. Reaction from blue vinous red. —*Fl. Hibern. II*, *p.* 105, *Leight. Gr. Brit.*, *p.* 401, *Br. Graph.*, *p.* 56 *and f.* 36.—On holly, Great Britain.

238. **A. ilicinella,** Nyl. Similar to the preceding, but the apoth. smaller, with smaller 4–7 locular spores. Reaction vinous red.—*Flora* 1867, *p.* 109, *Leight. Gr. Brit.*, *p.* 401, *Almq.*, *p.* 41.— Europe. Straits of Magellan, Hassler Exp.—Hardly differs from the preceding.

239. **A. palmicola,** Ach. Thallus thin, white. Apoth. minute, oblong-difform, sometimes somewhat divided, rather prominent. Spores oblong, 4 locular, .010–14 by .004–6 mm. Reaction from blue vinous red.—*Syn.*, *p.* 5, *Nyl. Flora* 1876, *p.* 284, *Mull. Arg. Graph. Fée. p.* 57.—Egypt, and tropical.

240. **A. turbatula,** Nyl. Thallus ashy-brown or ashy-green. Apoth. difform, innate, plane. Spores oblong, 4 locular, brown or decolorate, .032–48 by .014–18 mm. Hypothecium pale. Reaction dark vinous red.—*Fueg. p.* 18. *A. heteromorpha Mull. Arg. Cape Horn* (1888,) *p.* 169, *fide seipso in Lich. Spegazz.*, *p.* 50.—Fuegia.

241. **A. pulveracea,** Müll. Arg. Thallus yellowish-white, mealy. Apoth. orbicular and angulose, finally convex, within dark. Spores 2–4 locular, the upper cell largest, .010–14 by .004–45 mm.—*Lich. Spegazz.*, *p.* 107. *A. palmicola Nyl. Fueg.*, *p.* 18, *fide Mull. Arg.*, *l. c.*—Staten Island, Straits of Magellan.

242. **A. miserula,** Nyl. Thallus white, somewhat mealy, rimose, determinate. Apoth. minute, punctiform, oblong or difform, or often subangulose or subramose, plane. Spores 3–4 locular, brown or decolorate, .012–14 by .0045 mm. Reaction yellow.—*Pr. N. Gr.*, *p.* 106. *Exs. Lindig*, *n.* 786.—Bogota, S. America.

243. **A. pruinosula,** Nyl. Thallus thin, white. Apoth. oblong or subangulose, innate, plane, thinly white pruinose. Spores ovoid oblong, at length brown, 4 locular, .011–14 by .004–5 mm. Reaction blue.—*Pr. N. Gr.*, *p.* 573. *Exs. Lindig*, *n.* 6.—New Grenada. A plant very near this, with rounded pruinose apoth., spores oblong, 4 locular, .013–16 by .0034–4 mm., reaction vinous red, occurs in Florida in hb. Tuck. Sent to Nyl. under n. 93.

244. **A. pyrenuloides,** Müll. Arg. Thallus thin, whitish ash-colored. Apoth. orbicular or obsoletely irregular, sessile, hemispherical. Spores ovoid-dactyloid, 4 locular, .016–21 by .005–55 mm.—*Beitr., n.* 1093.—Australia.

245. **A. mangiferæ,** Müll. Arg. Thallus thin, white. Apoth. orbicular, black, when wet reddish black, immersed, erumpent, surrounded by a spurious thalline margin, the hypothecium dark. Spores somewhat staff-shaped, 4 locular, .020–28 by .0025–4 mm.—*Beitr., n.* 1487.—Cochin China.

246. **A. melanophthalma,** Duf. Thallus thin, white, or evanescent, limited by a black line. Apoth. innate, plane, rounded and difform, within pale or blackening. Spores oblong-ovoid, 5–6 locular, the upper cell larger, brown or decolorate, .014–22 by .005–8 mm. Reaction blue. Spermatia .006 mm. long. *Nyl. Arth., p.* 94, *Pr. Gall., p.* 166, *Pr. N. Gr., p.* 106, *Almq., p.* 42. *A. coniangioides Bagl. Critt. Ital. II,* 119, *fide Arn. Flora* 1887, *p.* 155. *Exs. Lojka L. U., n.* 294.—Europe. S. America.

247. **A. platygraphella,** Nyl. Thallus thin, white, rimulose. Apoth. rounded or oblong, plane, with a thin or evanescent thalline margin, whitish pruinose, within dark. Spores oblong-ovoid, 4 locular, .013–16 by .005 mm. Reaction vinous red.—*New Zeal.* (1865,) *p.* 258, *ibid.* (1888,) *p.* 120.—New Zealand.

248. **A. polymorpha,** Ach. Thallus white, bordered by a dark line. Apoth. rounded, angular, or difform, dilated, plane, rugose. Spores ovoid or fusiform ovoid, brown or decolorate, .015–22 by .005–8 mm. Reaction from blue vinous red.—*Syn., p.* 7. *Nyl. Arth., p.* 94, (*non Pr. N. Gr., p.* 105.) *Mull. Arg. Graph. Fée., p.* 57. *A. dilatata Fée Ess., p.* 54 *and t.* 13 *f.* 7, *Suppl., p.* 38, *and t.* 40 *f.* 9, (*non A. polymorpha Fée. Ess., p.* 53, which, according to Müll. Arg. *l. c. p.* 21, *is a Melaspilea.*)—Tropical. Southern United States in hb. Tuck.

Var. maculans, Ach. Apoth. appressed, difform, dilated, confluent.—*Syn., p.* 7, *Fée Ess., p.* 53. *Spiloma Ach. L. U., p.* 136. *A. bombacina ibid., p.* 143, *Syn., p.* 7.—Tropical.

Var. Guayacana, Müll. Arg. Apoth. smaller and more rounded, or now oblong-elliptical. Spores .015–16 by .005 mm.—*Graph. Fée., p.* 58. *A. dilatata var. Fée Ess., p.* 39.—Tropical.

249. **A. dispartibilis,** Nyl.—*Flora* 1886, *p.* 104 (*nomen.*) *A. polymorpha v. dispartibilis, Mull. Arg. in Sched. Exs. Wright Cub., n.* 123*d.*—Not in my collection.

250. **A. meizomorpha,** Nyl. Thallus thin, white. Apoth. rounded-difform, within dark. Spores 6 locular, the upper cell larger, .018–24 by .006–9 mm.—*N. Zeal.* 1888, *p.* 122, *and f.* 7. *A.*

polymorpha Pr. N. Gr., *p.* 105. *Exs. Lindig*, *n.* 2562, 2701, 2780. —New Grenada. Portugal, "quod corrigendum in *Flora* 1865, *p.* 605," Nyl. l. c., which, according to *Arn. Flora* 1870, *p.* 841, was "? *A. turbidula*."

251. **A. paraffinis,** Nyl. Thallus thin, white, determinate. Apoth. maculæform or somewhat angulose-rounded, somewhat rugulose, within dark. Spores ovoid-oblong, brown or decolorate, 6 locular, .024–32 by .009–12 mm. Reaction vinous red.—*Syn. N. Caled.*, *p.* 63, *N. Zeal.* (1888,) *p.* 122.—New Caledonia, New Zealand.

252. **A. complanata,** Fée. Thallus thin, white. Apoth. rounded or angular and difform, dilated, plane. Spores ovoid, brown or decolorate, 4–6 locular, the extreme cells larger, .022–32 by .007–10 mm. Reaction blue.—*Ess.*, *p.* 54, *Suppl.*, *p.* 39 *and t.* 40 *f.* 10. *Nyl. Pr. N. Gr.*, *p.* 106, *Antill.*, *p.* 18. *Mull. Arg. Graph. Fée. p.* 18. *A. subrotunda Fée Suppl.*, *p.* 39, *fide Nyl. Exot. Peruv.*, *p.* 231, *and Mull. Arg. l. c.*—*Exs. Lindig*, *n.* 760, *Wright*, *Cub.*, *n.* 144, *a*, *b*, *c*, *d*, 147.—Tropical. S. Carolina and Florida in hb. Tuck.

253. **A. propinqua,** Nyl. Similar to the preceding, but the brown 4–6 locular spores .019–25 by .009–11 mm. Reaction from blue vinous red.—*Pr. N. Gr.*, *p.* 106.—Ceylon, Guinea.

254. **A. excedens,** Nyl. Similar to *A. complanata*, but the spores brown, ovoid oblong, 6 locular, .030–36 by .010–15 mm. Reaction from blue vinous red.—*Pr. N. Gr. p.* 106, *N. Zeal.* (1888,) *p.* 121. *Exs. Lindig*, *n.* 733. S. America, New Zealand; and a plant from Oregon, Pringle, 1881, with 6 locular, curved, colorless spores, .027 by .008–10 mm., is referred here by Nyl. *in litt.*

255. **A. subexcedens,** Nyl. Similar to *A. complanata*, but the finally brown, 6 locular spores, .027–30 by .011–13 mm.—*Flora* 1886, *p.* 104 (*nomen*) *Fueg.*, *p.* 18. *Exs. Wright*, *Cub.*, *n.* 144 *f. and* 195.—Cuba, Fuegia.

256. **A. complanatula,** Müll. Arg. Thallus inconspicuous. Apoth. orbicular, or slightly angulose, depressed, within black, when young greyish-pruinose. Spores 4 locular, .010–12 by .004–5 mm.—*Socotr.*, *p.* 13.—Socotra, Africa.

257. **A. aletea,** (Mass.) Thallus greenish-white, limited by a dark line. Apoth. scattered, minute, difform, innate-sessile, at length somewhat convex. Spores oblong-ovoid, 2–4 locular, very minute.—*Coniangium*, *Kph. Amboin.*, *p.* 7.—Amboina, Africa.

258. **A. mazozia,** (Mass.) Thallus white, indeterminate. Apoth. minute, subpunctiform, difform, scattered, numerous, plane, rugose.

Spores oblong-ovoid, 2–4 locular, minute.—*Nævia, Kph. Amboin., p.* 7.—Amboina.

259. **A.** ——. Thallus thin, white. Apoth. adnate, orbicular or elliptical, convex, within dark reddish-brown. Spores oblong, 4 locular, .013–15 by .0035–5 mm. Reaction none —Port Famine, Straits of Magellan, Hassler Exp. Sent to Nyl. under n. 10.

260. **A.** ——. Thallus white, somewhat tartareous. Apoth. irregularly shaped, oblong and lobate, adnate, convex, within pale. Spores ovoid, 4 locular, the upper cells larger, .016–18 by .007 mm. Reaction blue.—Galapagos Islands, Hassler Exp. Sent to Nyl. under n. 13.

†† Apoth. from rounded becoming elongated, or linear and stellate.

261. **A. punctiformis,** Ach. Thallus white, determinate, or evanescent. Apoth. minute, rounded, oblong or somewhat difform, (hence rather belonging to the previous section,) but in other specimens referred to the same species, elongated and sparingly branched, within pale. Spores oblong-ovoid, 4–(6) locular, .016–24 by .006–8 mm. Reaction blue.—*L. U., p.* 141, and *var. olivacea, glaucescens*, differing only in the color of the thallus, *Syn., p.* 4. *Nyl. Arth., p.* 31, *Pr. Gall., p.* 167, *Scand., p.* 260, *Kbr. Syst. p.* 293, *Wain. Adjum. II, p.* 159, *Almq., p.* 42. *A. verrucarioides Ach. Syn., p.* 4. *A. ecrustacea Duf. Jour. Phys., p.* 6. *A. atomaria, celtidis* and *populina* Mass. Ric., p. 50. *A. quercus Hepp, Mull. Arg. Genev., p.* 70. *A. Oleandri Rab. Exs., n.* 972. *A. nudata Chev. Par., p.* 543. *A. griseo-alba Anz. Cat. Sondr., p.* 94. *A. microscopica Schær. Spic., p.* 246, *Hepp., Exs., n.* 560. *Naevia orbicularis Fr. Exs., n.* 9. *Opegrapha atra v. abbreviata Fr. L. E., p.* 367, *saltem p. p., Tuck. Syn.* 1848, *p.* 75.—Europe, N. America, widely diffused. The synonymy shows the difficulty of fixing the limits of this plant. It perhaps includes also the *A. epipasta Ach.* of *Leight. Gr. Brit.* and *Kbr. Syst.* The New England plant has the thallus now obsolete and now milk white. Nyl. has referred here as "*A. punctiformis, optima*," a New Bedford plant on white pine, in which the spores are club shaped, 4–6 locular, the upper cell larger, .016–28 by .007–9 mm.; spermatia .005–7 mm. long. A plant from Illinois, E. Hall, does not differ from a European specimen called "*A. celtidis b. fraxinea Hepp.*" in hb. Willey, communicated by Dr. Müller. A plant from the mountains of N. Carolina in hb. Eckfeldt, with very minute, numerous, punctiform, rounded apoth., the spores ovoid, 3–4 locular, .013–16 by .0045–55 mm., seems near *A. microscopica* Mass.—*A. epipasta* of Kbr. is called *A. microscopica* (Ehrh.) Schær. *Spicil, p.* 246; and *A. punctiformis, verrucarioides*, and *epipasta* Ach. are given as synonyms p. p. in

Hepp. Exs., *n.* 560. Arnold, in *Flora* 1884, *p.* 649, gives *A. populina* Mass. as a distinct species, with *A. ilicina* Tayl. as a synonym, *A. oleandri* Rab. and *A. microscopica* Ehrh. as forms, and refers to *Norrl. n.* 234, called *A. punctiformis*. *Ach. Syn.*, *p.* 75, queries whether his *opegrapha epipasta* is distinct from *A. punctiformis*.

Var. quadriseptata, Ohl. Spores 5 locular, .022–25 by .006 mm. —*Preuss.*, *p.* 41, *Arn. Flora* 1872, *p.* 572.—Europe.

Var. subeminula, Nyl. Thallus thin, white. Apoth. rounded or oblong, somewhat prominent, plane. Spores .014–17 by .006–7 mm. Reaction vinous red.—*Flora* 1876, *p.* 284.—Egypt.

Var. regularis, (Ach.) *Nyl. in litt. Stitz. Helv.*, *n.* 1101. *Exs. Anz. Lang*, *n.* 208. *A. obscura var. Ach. hb.*—Europe.—Not seen.

262. ***A. parallelula,** Norm. Apoth. from rounded linear-oblong, commonly somewhat parallel. Spores commonly a little smaller than in *A. punctiformis*.—*Norveg.*, *p.* 32.—Norway.

263. ***A. boreella,** Wain. Thallus inconspicuous. Apoth. very minute, maculæform, rounded or difform, erumpent, plane. Spores oblong-ovoid, 4 locular, .014–17 by .005–7 mm. Reaction from blue vinous red.—*Adjum. II*, *p.* 160. Lapland.

264. **A. epipastoides,** Nyl. Apoth. small, irregularly linear, rarely flexuous-difform, when young punctiform. Spores .016–23 by .005–7 mm. Reaction vinous red.—*Flora* 1873, *p.* 206, Arn. Flora 1881, p. 254, who thinks it is *A. punctiformis v. microscopica*, and refers to *Nyl. Flora* 1863, *p.* 79. *Opegrapha epipasta* Ach. and *A. astroidea v. epipasta Nyl. Arth. p.* 96, *Pr. Gall. p.* 166, who also refers here *A. tymnocarpa Ach. Syn.*, *p.* 6, *A. quercina* and *quercicola Chev. Par.*, *p.* 544, *A. celtidis* Mass. and *A. epipasta Leight.*—Europe.—An Illinois specimen in hb. Tuck. marked "A. astroidea v. epipasta, sp. 2, 3–4 loc.," seems to belong here, as well as California specimens in hb. Sprague; and Nyl. has referred here specimens from New Bedford. As to "A. epipastoides Nyl." Leight. *Grevillea*, 1872, *p.* 59, *and t.* 4, *f.* 8, see under *A. gregaria*.

Var. galactitella, Nyl. With the aspect of *A. galactites*, but differing in the spores and reaction.—*Flora* 1873, *p.* 206.—Pyrenees.

265. **A. stenospora,** Müll. Arg. Thallus inconspicuous. Apoth. suborbicular or oblong, obsoletely angulose, semi-immersed, convex, at first veiled by the thallus. Spores subfusiform, 4 locular, .014–27 by .0025–35 mm. Reaction blue.—*Flora* 1872, *p.* 503, where it is said to be near *A. punctiformis*, and to differ from *A. betulicola Mass. Descr.*, *p.* 22, *t.* 3 *f.* 1–8 in more regular not acutely angulose apoth., and the outline of the spores.—Switzerland.

266. **A. dispersella,** Müll. Arg. Thallus from pale brown becoming white, thin, bordered by a dark line. Apoth. numerous, very minute, from orbicular oblong-elliptical and linear-difform, often stellate-ramulose, innate sessile, plane, within pale. Spores cylindrical-obovoid, 4 locular, .016–19 by .005–7 mm. *Beitr.*, *n.* 225.—Caracas, S. America.

267. **A. oblongula,** Müll. Arg. Thallus thin, white, evanescent. Apoth. from elliptical elongated, straight or curved, obsoletely bifurcate, within pale. Spores dactyloid-obovoid, 4 locular, .014–18 by .0055–6 mm.—*Beitr.*, *n.* 1094.—Australia.

268. **A. obscurella,** Müll. Arg. Thallus dark ash-colored or smoky-black, smooth, bordered by a dark line. Apoth. linear, simple, or divergently 1–2 branched, or depauperate-stellate, with a thin distinct margin, when dry somewhat channelled, when wet convex, ashy pruinose, within greenish. Spores cylindrical-obovoid, at length brown, 4–6 locular, the upper cell larger, .015–22 by .005–65 mm.—*Beitr.*, *n.* 223.—New Grenada.

269. **A. linearis,** Kph. Thallus thin, white, bordered by a black line. Apoth. minute, slender, interruptedly somewhat linear, simple, or somewhat flexuous and ramulose, scattered, somewhat immersed in white thalline prominences. Spores oblong-ovoid, 4 locular, the upper cell larger, .028–37 by .008–12 mm.—*Flora* 1873, *p.* 466.—China.

270. **A. gracilenta,** Müll. Arg. Thallus white, obsoletely black limited. Apoth. innate-erumpent, slender, elongated, and somewhat rectangularly few branched, variously diffract-curved and subtorulose-uneven, convex, within dark. Spores dactyloid-obovoid, often curved, 6 locular, the upper cells larger, .021 by .008 mm.—*Beitr.*, *n.* 522. *Shirley* 1889, *p.* 152.—Australia.

271. **A. gracillima,** Müll. Arg. Thallus thin, white. Apoth. lirellæform, emergent, simple and irregularly branched. Spores cylindrical-obovoid, 6 locular, the upper cell larger, .018–24 by .008–10 mm.—*Beitr.*, *n.* 1195.—Australia.

272. **A. leptogramma,** Müll. Arg. Thallus thin, white or mealy-white, effuse. Apoth. slender, irregularly linear, and here and there almost short-substellate-ramulose, sometimes powdery. Spores oblong-ovoid, 6 locular, the upper cell larger, .028 by .011–12 mm. —*Afr. Occ.*, *p.* 39.—Africa.

273. **A. moniliformis,** Nyl. Thallus pale brown. Apoth. linear, moniliform-uneven, somewhat flexuous and branched. Spores obovoid-fusiform, 7–8 locular, the intermediate cells larger, .018–20 by .006–7 mm.—*En.*, *p.* 133, *Exot. Peruv.*, *p.* 234, *Mull. Arg.*

Graph. Feé. p. 59. *Coniocarpon caribæum Fée Ess., p.* 99, *p. p. fide Mull. Arg. l. c.*—Tropical.

274. **A. hapaliza,** Nyl. Thallus thin, white. Apoth. innate, depressed, oblong-linear, straight or a little flexuous, sometimes 2–3 branched. within pale. Spores ovoid, 6 locular. Reaction blue.—*Chil., p.* 172.—Chili.—"Est quasi *A. astroidea* Ach., simplicior, sed distinguenda apoth. formæ simplicioris, sporis constanter 5 septatis."

275. **A. oxytera,** Nyl. Thallus thin, white, determinate, limited by a black line. Apoth. linear-lanceolate, or lanceolate-difform, sometimes shorter and variable, plane, appressed or innate, within pale. Spores fusiform-ovoid, at length brown, 4 locular, .013–14 by .006 mm. Reaction blue.—*Pr. N. Gr., p.* 105.—Mexico: and perhaps a plant from Florida in hb. Calkins, and from Texas. E. D. Mead, may be referred here.

276. **A. variiformis,** Nyl. Thallus thin, white. Apoth. emergent or superficial, linear, often a little flexuous, plane or slightly concave. Spores oblong, mostly 6 locular, .016–18 by .005–7 mm. Reaction from blue vinous red.—*Alger., p.* 336, *Pr. Gall., p.* 167.—Algiers.

277. **A. albopulverea,** Nyl. Thallus thin, white, mealy. Apoth. superficial, oblong-linear or sometimes lobate, thinly pruinose. Spores ovoid, 4 locular, .011–13 by .004–6 mm. Reaction vinous red.—*Alger., p.* 336, *Pr. Gall., p.* 167.—Algiers.

278. **A. stictoides,** (Desmaz.) Nyl. Thallus thin, white. Apoth. erumpent, longitudinally disposed, linear-lanceolate, often narrow. Spores oblong or oblong-ovoid, 4 locular, .016–21 by .006–8 mm. Reaction from blue vinous red.—*Opegrapha Desmaz. Ann. Sci. Nat.* 1848, *p.* 360, *Nyl. Arth., p.* 97, *Pr. Gall., p.* 167.—France.

279. **A. radiata,** (Pers.) Th. Fr. Thallus whitish, cinerascent, or darkening or obsolete, determinate, often bordered by a dark line. Apoth. irregularly shaped, stellate difform, or ramulose, often erumpent, plane or slightly convex, within pale. Spores ovoid-oblong, 4 locular, .010–20 by .004–6 mm.; figured in Hepp., n. 351, 352, 353. Reaction from blue vinous red.—*Opegrapha Pers. Ust. Ann.* 1794, *st.* 7, *p.* 29. *Arthonia Th. Fr. Arct., p.* 240, *Almq., p.* 35. *A. astroidea Ach. Syn., p.* 6, *Nyl. Arth., p.* 95, *Pr. Gall., p.* 166, *Scand., p.* 259, *and aucct. Arn. Flora* 1881, *p.* 202, 1884, *p.* 646. *A. vulgaris Schær. Spic., p.* 246, *Kbr. Syn., p.* 290. *A. curvula Fw. Exs., n.* 177. *A. betulicola Mass. Descr., p.* 12, *fide Almq. A. obscura Ach. L. U., p.* 146, *fide Nyl. Arth., p.* 95, and perhaps of the catalogues of Muhlenberg and Torrey. *Ope-*

grapha atra **macularis Fr. L. E.*, *p.* 367, fide Nyl. *Arth.*, *p.* 95. Exs. Norrl., n. 232, 233.—A common and widely dispersed, probably cosmopolitan lichen, of which many varieties have been made, some of them of little account.

Var. Swartziana, (Ach.) Nyl. Apoth. larger, more rounded and entire, somewhat convex, the spores rather larger.—*A. Swartziana Ach. L. U.*, *p.* 142, *Syn.*, *p.* 5. *A. astroidea var. Nyl. Arth.*, *p.* 95, *Almq.*, *p.* 36. *A. vulgaris var. Schær. Spic.*, *p.* 246. *Opegrapha atra* **macularis Tuck. Syn.*, 1848, *p.* 75, *fide Nyl. Arth.*, *p.* 96. *A. cerasina Chev. Par.*, *p.* 541, *and A. populina Mass. Ric.*, *p.* 50, *fide Nyl. l. c. A. betulicola Mass. Descr.*, *p.* 12, *fide Arn.*, *Flora* 1884, *p.* 647.—Europe, United States.

f. cinerascens, Ach. Smaller, more slender, angulose-difform. —*Syn.*, *p.* 5, *Arn. Flora* 1881, *p.* 202.

Var. melantera, (Ach.) Almq. Thallus from ash-colored becoming black, shining, somewhat fatty. Apoth. appressed, plane, suborbicular or rarely oblong, rugose.—*A. melantera Ach. L. U.*, *p.* 143. *A. obscura var. Syn.*, *p.* 7. *A. radiata var. Almq.*, *p.* 36. *A. astroidea var. Arn. Flora* 1881, *p.* 203. *A. sorbina Kbr. Pg.*, *p.* 265, *exs. n.* 20, *fide Almq.*, but which in Nyl. *Pr. Gall.*, *p.* 167, is referred to *var. Swarziana. A. sorbina* Norm. *Spec. L. nat.*, *p.* 120, is the same, *fide Almq.*, the apoth. innate, plane, angulate, the hymenium fuligineous, with thick, distinct, parallel paraphyses.

Var. hyparcha, *Ach. L. U.*, *p.* 146, does not differ from typical *A. astroidea*; and varr. *stellulata* and *tynnocarpa ibid.*, *p.* 146, are smaller and little marked forms, fide *Nyl. Scand.*, *p.* 259. *Var. opegraphina Ach. Syn.*, *p.* 6, is characterized as having depressed, linear, submarginate, or crowded, convex difform, substellate, scabrous apoth. As to "*A. opegraphina Ach.*," Leight. *Grevillea* 1872, *p.* 59, *and t.* 4 *f.* 7, see *A. gregaria*. According to *Arn. Flora* 1881, *p.* 204, the name *opegraphina* is superfluous.

Var. applanata, Wain. Apoth. maculæform, difform, dilated, plane, within dark. Spores ovoid-oblong, .014–16 by .005–6 mm. —*Adjum. II*, *p.* 157.—Scandinavia.

Var. angustata, Wain. Apoth. narrow, simple or radiate, a little more elevated, the disk almost cleft.—*Adjum.*, *l. c.*—Scandinavia.

Var. olivacea, Wain. Like the preceding var., but the epithecium sooty olive-colored. Spores .013–16 by .005–6 mm.—*Adjum. l. c.*—Scandinavia.

Var. subparallela, Müll. Arg. Thallus white. Apoth. small, somewhat parallel, crowded or more often somewhat solitary, here and there suborbicular.—*Beitr.*, *n.* 129.—Switzerland.

280. **A. subastroidea,** Nyl. (*non Anz.*) Thallus thin, white. Apoth. appressed, dilated, stellate lobate, plane or a little convex,

within pale. Spores clavate, 6 locular, the upper cell larger, .019–27 by .0055–7 mm. Reaction of the hymenium vinous red; of the external parts adjacent, blue.—*Flora* 1886, *p.* 104 (*nomen.*) *A parastroidea Nyl. in Mull. Arg. Sched. Graph. Cub.* But both these names have been anticipated in print. *Exs. Wright Cub.*, *n.* 144*g*. —Cuba.

281. **A. astrica,** Tuck. Thallus white or ash-colored. Apoth. small, angular and oblong, plane, within pale. Spores oblong-ovoid, 6–7 locular, the upper cell larger, .018–22 by .004–5 mm. Reactions as in the preceding.—*Texas in hb. Tuck.* The small fragment I possess is hardly sufficient to enable me to give a full description. Perhaps not different from the preceding.

282. **A. parastroidea,** Lamy. Thallus thin, pale red, rimulose. Apoth. depressed, within pale reddish-brown. Spores oblong-ovoid, decolorate or pale brown, 4–5 locular, .015–16 by .006–7 mm.—*Mt. Dore*, *p.* 152.—France.

283. **A. subastroidella,** Nyl. Thallus inconspicuous. Apoth. minute, confusedly stellate, uneven. Spores ovoid-oblong, 4 locular, .011–12 by .004–5 mm. Reaction of the thekes vinous red.—*Flora* 1885, *p.* 312.—On witch hazel, New Bedford.

284. **A. quintaria,** Nyl. Thallus thin, white. Apoth. substellate, simpler than in *A. radiata*. Spores oblong-ovoid, club-shaped, 4-8 locular, the upper cell larger, .018–29 by .007–11 mm. Reaction vinous red.—*Flora* 1885, *p.* 312.—On holly, New Bedford. New Jersey *in hb. Eckfeldt*. Florida, Miss Wilson, *in hb. Sprague*, and *hb. Calkins*.

285. **A. xylographica,** Nyl. Thallus thin, white. Apoth. appressed, lanceolate-difform or substellate. Spores oblong-ovoid, 4 locular, .012–15 by .004–5 mm. Reaction blue.—*Flora* 1885, *p.* 312. —On *Vaccinium corymbosum*, New Bedford, very rare.

286. **A. hamamelidis,** Nyl. Similar to *A. radiata*, but the 4 locular spores .011–12 by .004 mm. Reaction from blue dark vinous red.—*Flora* 1885, *p.* 447.—On witch hazel, New Bedford.

287. **A. Armoricana,** Nyl. Similar to *A. radiata*, but the apoth. larger and more simple, somewhat confluent, plane. Spores 4 locular.—*Flora* 1865, *p.* 355. *Leight. Gr. Brit.*, *p.* 401.—Europe.

288. **A. ramosula,** Nyl. Thallus thin, whitish ash-colored, limited by a black line. Apoth. brownish-black, appressed, plane, stellate-radiate-ramulose, now transversely diffract. Spores oblong-ovoid, 4 locular, brown, .016 by .005 mm. Reaction from blue vinous red.—*Alger.*, *p.* 355, *Chil.*, *p.* 170, *Pr. Gall.*, *p.* 167. *Ope-*

grapha scripta DR. Alger., *p.* 281. Algiers. Chili. In Nyl. *Arth.*, *p.* 97, the name is spelled *ramulosa*.

289. **A. stellaris,** Kph. Thallus thin, white. Apoth. linear, stellate-radiate. Spores oblong-ovoid, 4–6 locular .014–19 by .005–6 mm. Reaction vinous red or violet.—*Lich. Bay.*, *p.* 296.—*Coniangium albellum Zw. Exs.*, *n.* 358. *fide Almq.*, *p.* 21.—Europe.

290. **A. radians,** Müll. Arg. Thallus thin, greyish-white, effuse. Apoth. stellate-ramose, the branches often acuminate, and depressed in the middle, spuriously margined, the disk at length obsoletely pallescent, the hypothecium pale. Spores oblong-obovoid, 4 locular, the upper cell larger, .020 by .005–6 mm.—*Parag.*, *p.* 26.—Paraguay.

291. **A. tenuissima,** Müll. Arg. Thallus thin, white, or evanescent. Apoth. lirellate, substellate-ramose, commonly few branched, the branches short, rather straight, slightly prominent. Spores cylindrical-obovoid, 4 locular, the upper cell larger, .016–18 by .006–7 mm.—*Beitr.*, *n.* 1450.—Trinidad Islands.

292. **A. ramulosa,** Kn. and Mitt. Thallus dull white, very thin. Apoth. superficial, black with a dark brown base and sides, much branched, bordered by a narrow undulating line. Spores 3 septate, [4 locular,] oblong or obovate, brown, the upper cell largest, measuring from 0,00020 to 0,00015 of an inch. Apoth. more branched than those of *A. astroidea* Ach., and more prominent.—*N. Zeal.*, *p.* 105, *and t.* 12, *f.* 32.—New Zealand.—Not mentioned in *Nyl. N. Zeal.* 1888.

293. **A. indistincta,** Kn. and Mitt. Thallus ash-colored. Apoth. linear-difform, subramose, or smaller and subnebulose. Spores ellipsoid, brown or decolorate, 4 locular, .026–28 by .010–11 mm. Reaction vinous red.—*N. Zeal.*, *p.* 105, *and t.* 12, *f.* 30, *Nyl. N. Zeal.* (1888,) *p.* 120.—New Zealand.

294. **A. subvelata,** Nyl. Thallus thin, white. Apoth. macular-submoniliform, or vaguely substellate-difform, small, uneven, commonly veiled by the thallus, within dark. Spores oblong-ovoid, 4–7 locular, .013–18 by .0045–65 mm. Reaction from blue vinous red.—*Flora* 1869, *p.* 72.—Bengal.

295. **A. torulosa,** Fée, Nyl. Thallus olive-brown, bordered by a dark line. Apoth. short-stellate-radiate, slender, plane, within dark, the hypothecium blackish-brown. Spores cylindrical-obovoid, 6 locular, the upper cell and often the lower one larger, .013–16 by .005–6 mm.—*Arthonia? Fée Ess.*, *p.* 55, *and t.* 49, *f.* 13 *bis. Coniocarpon? ibid. Suppl.*, *p.* 100, *and t.* 24, *f.* 1. *Nyl. En.*, *p.* 133. *Mull. Arg. Graph. Fée*, *p.* 58. *A. polymorpha v. substellata Fée*

(*non Ach.*) *Ess.*, *p.* 53. *A. dilatata Fée Suppl.*, *t.* 38, *p. p. fide Mull. Arg. l. c.*—Tropical in hb. Fée.

*** Spores 8-plurilocular.

296. **A. platygraphidea,** Nyl. Thallus thin, white, rugulose, determinate, limited by a dark line. Apoth. middling sized, rounded or rounded-difform, more rarely oblong, often prominent, sometimes bordered by a spurious thalline margin, within pale. Spores fusiform, brown or decolorate, 14–16 locular, .052–73 by .014–22 mm. Reaction blue.—*Pr. N. Gr.*, *p.* 104.—Mexico. Florida, Austin in hb. Tuck.

297. **A. angulata,** Fée. Thallus white, somewhat mealy. Apoth. scattered, roundish, oblong, and angular, depressed. Spores ellipsoid-lanceolate, 12–14 locular, the extreme cells shorter, .048–55 by .011–14 mm.—*Suppl.*, *p.* 39, *and t.* 40, *f.* 9. *Mull. Arg. Graph. Fée. p.* 59. *Graphis, Mass. Mem.*, *p.* 111. *A. polymorpha Eschw. Braz.*, *p.* 111, *fide Nyl. Pr. N. Gr.*, *p.* 104, *and Mull. Arg. Revis. Eschw.*, 2, *p.* 45. *A. tremellosa Eschw. Syst.*, *p.* 26, *and f.* 20. *Mass. Ric.*, *p.* 54, (*Arthothelium,*) *ut videtur.*—Tropical.—But according to Th. Fr. Gen. Heterol., p. 45, Eschweiler's plant is a *Myriangium.*

298. **A. stictica,** (Fée) Nyl. Similar to *A. angulata*, but the thallus olive-green. Spores brownish in age, 10–12 locular, the two intermediate cells a little larger, .070–80 by .015–23 mm.—*Lecidea Fée Suppl.*, *p.* 103. *Nyl. En.*, *p.* 133. *Mull. Arg. Graph. Fée. p.* 60.—West Indies.

299. **A. atrata,** (Fée) Mull. Arg. Thallus greyish, rimose, limited by a dark zone. Apoth. substellate-ramose, obtusely short-branched, dilated, innate, concave when dry, within fulvescent. Spores oblong-ovoid, rounded at the extremities, 9–12 locular, the extreme and the middle cells commonly a little larger, .050–55 by .019–23 mm.—*Graphis Fée Ess.*, *p.* 35, *Suppl.*, *p.* 27, *and t.* 19. *Mull. Arg. Graph. Fée. p.* 59; *non A. substellata Nyl. Pr. N. Gr.*, *p.* 106, *nec A. atrata Tuck. Gen.*, *p.* 222.—Tropical.

300. **A. calospora,** Müll. Arg. Thallus thin, white, about the apoth. tumid. Apoth. orbicular, angulose, plano-convex, when wet blackish brown. Spores 10–12 locular, commonly curved, .050–60 by .018–20 mm.—*Socotr.*, *p.* 12.—Socotra, Africa.

301. **A. pellæa,** Leight. Thallus dirty-brown, rimulose, bordered by a dark line. Apoth. brownish-black, rounded-difform, plane. Spores linear-obovate, brown, 8–10 locular. Reaction vinous red.—*Ceylon*, *p.* 180, *and t.* 36, *f.* 37, according to which the extreme cells of the spores are larger.—Ceylon.

302. **A. myriocarpa,** Müll. Arg. Thallus thin, white, smooth, or at length rugulose. Apoth. black, pale when wet, very numerous and small, erumpent, orbicular or now linear-oblong, or serially confluent, plane, naked, within pale. Spores curved, obtuse, (8)–10 locular, .035–40 by .015 mm., the extreme cells smaller.—*Beitr.*, *n.* 1488.—Cochin China.—Compared to *A. gracillima* and *A. torulosa*.

303. **A. leprariella,** Nyl. Thallus white, leprous, effuse. Apoth. minute, innate, rounded or oblong. Spores in the small specimen seen from hb. Tuck. 4–5 locular, at length brown, .045–50 by .018–22 mm. Reaction blue.—*En.*, *p.* 133, where it is placed among the species with plurilocular or muriform spores.—*Exs. Hook.*, *n.* 2268.—East Indies.

Of the following, belonging to the preceding sections, the descriptions have not been seen:

A. (Nævia) Bassanensis, Beltr. *Lich. Bassan.* 1858, *p.* 251.—Italy.

A. dendritella, Nyl. *Phil. Trans.* 1879, *p.* 412. Foliicola. Spores 4 locular, .010–14 by .004–5 mm.—Rodriguez Islands.

A. insinuata, Stirt. *Glasg. Trans.* 1875, *p.* 89, *Bot. Jahrber.* 1875, *p.* 43.—Europe.

A. montellica, Mass. *Lich. Nuov.*, *p.* 24.—Italy.

A. Pandani, Nyl. in *Jardin Nat. Hist. de l'Archipel de Mendana*, 1857, p. 302 (nomen.)—Mendana.

A. subnitidula, Nyl. in *Mull. Arg. Sched. Graph. Cub. Exs. Wr. Cub.*, *n.* 155. Not in my collection.—Cuba.

A. turbidula, Nyl. *Flora* 1865, *p.* 605.—Europe.

A. velata, Stirt. *Jour. Linn. Soc.*, 1876. *p.* 372. *Bot. Jahrber.* 1875, *p.* 113.—Bermuda.

A. castanea, *macularis*, *diluta*, *plumbea*, *lineola*, *immersa and crustacea*, *Chev. Jour. Phys.* 1822, *pp.* 53–55, are not referred to by later writers, and are probably forms of known species, or to be excluded.

Nævia Lauri, Caldes. *Comm. Soc. Crit. Ital.*, 1863, *p.* 89, *N. caricum* (Auersw.) *Fuckel. Syst. Myc.*, *p.* 249, and *N. paradoxa*, Rehm. *Ascom.*, *p.* 102, are claimed by the Mycologists; but Minks in *Symb.*, *pp.* 193, 197, 199, regards them as Lichens.

**** Parasitic. The spores 4 locular.

304. **A. varians,** (Dav.) Nyl. Parasitic on various lichens. Apoth. rounded or difform, plane or convex. Spores ovoid, 2–4 locular, .012–18 by 005–7 mm. Reaction from blue vinous red.—*Lichen. Dav. Trans. Linn. Soc.* 1794, *p.* 284, *and t.* 28, *f.* 3. *Nyl. Scand.*, *p.* 260, *Leight. Gr Brit.*, *p.* 402. *A. glaucomaria* and *A. parasemoides Nyl. Arth.*, *p.* 98, *Pr. Gall.*, *p.* 168, *fide seipso*, *Scand.*

l. c. Almq., *p.* 59. *Celidium Arn. Flora* 1874, *p.* 106. *C. grumosum Kbr. Pg.*, *p.* 457.—Europe; and a parasitic Arthonia on *Lecanora pallescens v. rosella*, New Bedford, and on a *Verrucaria* on limestone, Jamesville, N. Y., in hb. Willey, may probably be referred here.—*Exs. Norrl.*, *n.* 231.

Var. pallida, Rehm. Similar to *A. varians*, but also growing on bark.—*Celidium Rehm. in Arn. Exs.*, *n.* 376. *Almq.*, *p.* 60.—Europe.

Var. sordida, (Mass.) Arn. Apoth. rounded, confluent. Spores 4 locular, fusiform, .012 by .003 mm. *Conida Mass. Misc.*, *p.* 16, *Ric.*, *p.* 4. *Arn. Flora* 1874, *p.* 106 (*Celidium varians var.*)—Europe.

Var. carpathica, (Kbr.) Arn. *Lecidella Kbr. Pg.*, *p.* 212. *Arn. Flora* 1874, *p.* 106. But *Almq.*, *p.* 62, seems to include it in *A. intexta*, as also the *var. sordida*.

305. **A. intexta,** Almq. Parasitic on apoth. of *Lecidea enteroleuca rupicola*. Apoth. indistinct, combined with the hyphæ of the supporting plant. Spores clavate, 3–4 locular, .013–15 by .005–6 mm. Reaction vinous red.—*Almq.*, *p.* 60. *A. parasemoides Nyl.*, *p. p.*—Europe.

Var. pauperrima, Almq. Entirely destitute of paraphyses. Otherwise as in the species. Reaction none.—*Almq.*, *p.* 62.—Scandinavia.

306. **A. abrothallina,** Nyl. Parasitic on *Sticta D'Urvillei*, Falkland Islands. *Arth.*, *p.* 99 (*nomen.*)

Other parasitic plants now referred to *Celidium* as fungi, may perhaps also be considered as belonging to *Arthonia*, but have not yet been so referred by European authors; and according to Minks *Morph. Lich. Studien. p.* 23, species of *Celidium*, *Celidiopsis*, *Conida*, and *Abrothallus* are also to be considered as Arthonias.

***** Spores muriform. Arthothelium.

307. **A. cyrtodes,** (Tuck.) Nyl. Thallus thin, glaucescent. Apoth. brownish black, rounded, convex, within blackening. Spores oblong, 8–12 locular, .060–85 by .021–25 mm. Reaction blue.—*Pr. N. Gr.*, *p.* 66. *Exs. Wright Cub.*, *n.* 156, *c*, *d*, *e*, *fide Mull. Arg. in Sched.*—Cuba.

308. **A. distendens,** Nyl. Thallus thin, white, minutely granulose or granulate-uneven. Apoth. black, somewhat convex, almost middling sized, within blackening. Spores oblong or ellipsoid, submuriform-divided, the longitudinal cells 1–3, .065–75 by .023–27 mm. Reaction blue.—*Pr. N. Gr.*, *p.* 66.—*Flora* 1866, *p.* 298.

Exs. Wright Cub., n. 156, *a, f, g, fide Mull. Arg. in Sched.*—Cuba. Bahia, S. Am.

Tuckerman in *Obs.* 1864, *p.* 285, (*Syn. II, p.* 135,) unites the two species as *A. cyrtodes*. The species is defined as follows: "Thallus thin, glaucous-ash-colored, subcartilagineous, uneven, rimulose, somewhat limited by a black hypothallus. Apoth. about middling sized, adnate, rounded, convex, brownish-black, within of the same color. Spores oblong-ellipsoid, decolorate or rarely brown, 10–12 locular, and now muriform-divided, often curved, 3–5 times longer than broad.

"**a. cyrtodes.** Thallus greenish-glaucescent, the hypothallus less distinct, the spores oblong-ellipsoid, the sporoblasts entire. *Exs. Wright Cub., n.* 245.

"**b. distendens,** Nyl. Thallus at length cinerascent, the hypothallus black. Spores more oblong, now muriform-divided.—*Exs. Wright Cub., n.* 246."

309. **A. subcyrtodes,** Willey. Thallus thin, white. Apoth. rounded, convex. Spores 4–8, oblong-ovoid, muriform, the transverse cells about 8, the longitudinal in the centre about 3, .022–27 by .007–11 mm.—*Suppl., p.* 54.—Florida in hb. Calkins. Only a single small specimen has been seen.

310. **A. spectabilis,** Fl. Thallus thin, white, indeterminate, continuous or rimose. Apoth. irregular, difform, angulate or oblong, plane or convex, often bordered by the thallus. Spores ellipsoid, brown or decolorate, muriform, .030–36 by .010–15 mm.; figured in Hepp., n. 536. Reaction from blue vinous red. *Fl. exs., n.* 39, *fide Fr. L. E., p.* 371. *Mass. Ric., p.* 54, *Kbr. Syst., p.* 293, *Almq., p.* 39. *A. dispersa Duf., Nyl. Arth., p.* 93, *Chil., p.* 171. *A. difformis Nyl. En., p.* 144, *fide Almq. l. c. Opegrapha polymorpha Tuck. Syn.* (1848,) *Gen., p.* 222. *A. polymorpha Muhl. Cat., p.* 165, and under the same name in hb. Ravenel. *Exs. Lojka Hung., n.* 159.—Europe, S. America, Atlantic United States, and Ohio.

311. **A. homœophana,** Nyl. Thallus thin, white. Apoth. oblong or oblong-difform, innate, plane, within dark, the hypothecium pale. Spores oblong or oblong-ovoid, brown, muriform, .036–50 by .017–21 mm. Reaction vinous red.—*Pr. N. Gr., p.* 105, *Syn. N. Cald., p.* 65.—New Caledonia. Allied to *A. spectabilis*, the spores as in *Mycoporum pycnocarpum*.

312. **A. Huegelii,** (Kph.) Nyl. Thallus thin, white. Apoth. rounded, convex, within pale. Spores ellipsoid, muriform, brown, .045–55 by .018–23 mm. Reaction vinous red.—*Pr. N. Gr., p.* 275. *Lecidea, Kph. in litt.*—On corticolous *Frullanias*, Australia.

313. **A. Scandinavica,** Th. Fr. Thallus white, effuse, somewhat mealy. Apoth. maculæform, small, rounded, angulate or sinuate, plane or convex, rugulose, the hypothecium pale. Spores muriform, brown or decolorate, .024–33 by .013–16 mm. Reaction from blue vinous red.—*Vet. Ak. Vorh.* 1864, *p.* 273, *Flora* 1865, *p.* 485, *Nyl. in Wain. Tav.*, 119, *Wain. Adjum. II*, *p.* 158, *Almq.*, *p.* 158. *A. Onegensis Nyl. Flora* 1865, *p.* 3, *Lapp. Or.*, *p.* 157, *Exs. Norrl.*, *n.* 48, *fide Almq.*—Scandinavia.

f. Karelica, Wain. Apoth. smaller, difform, commonly oblong or crowded, somewhat radiate. Spores .016–25 by .009–14 mm.—*Adjum. l. c.*

314. **A. fusispora,** (Th. Fr.) Almq. Thallus as in the preceding. Apoth. infrequent, minute, crowded, somewhat pruinose. Spores muriform, ovate-lanceolate, acute, .022–23 by .008–12 mm. Reaction as in the preceding. Spermogones large, resembling the apoth., but more rugulose, the spermatia 4–5 mm. long.—*Almq.*, *p.* 38. *A. Scandinavica f. Th. Fr. l. c.*—Scandinavia.

315. **A. subastroidea,** Anz. Thallus thin, white, or inconspicuous. Apoth. minute and very minute, scattered, angulate-rounded, or a little difform, somewhat innate, obsoletely pruinose, within pale. Spores submuriform, narrowly ellipsoid-oblong, .023–33 by .0085–015 mm. Reaction of the hymenium blue, of the thekes vinous red.—*Comm. Soc. Critt. Ital. I*, *p.* 22. *Exs. Long.*, *n.* 468. *Almq.*, *p.* 40. In the index to *Kph. Gesch.*, *vol.* 3, the reference number is by misprint 229 instead of 5229. *A. anastomosans Arn. Verh. Wien. Bot. Ges.* 1872, *p.* 304, *Exs.*, *n.* 514, *fide Almq.*—Italy, Switzerland.

316. ***A. orbillifera,** Almq. Thallus inconspicuous. Apoth. very minute, commonly rounded, heaped, sometimes confluent, forming more or less complete rings fallen away in the centre. Spores ovoid, muriform, .021–27 by .010–15 mm., the transverse cells about 6, otherwise as in the preceding.—*Almq.*, *p.* 41.—On holly, Great Britain.

317. **A. Ruana,** Mass. Thallus thin, white or pale-green, thin, leprose, effuse or determinate. Apoth. very minute, punctiform-verruculose, crowded in centrifugal heaps, at length falling away and leaving irregular spots. Spores ellipsoid, commonly constricted in the middle, 6–8 locular and finally muriform, .018 by .006 mm.—*Ric.*, *p.* 49, *Kbr. Pg.*, *p.* 263. *A. anastomosans*, *Ach. fide Zw. Heid.*, *n.* 467.—Europe.

318. **A. Ruanidea,** Nyl. Thallus whitish ash-colored. Apoth. minute, scattered, rounded, oblong, or difform. Spores muriform, oblong-ovoid, .013–18 by .006–7.—*Nyl. in Stitz. Helv.*, *n.* 1097, (nomen,) *Exs. Lojka Univ.*, *n.* 42.—Switzerland.

319. **A. anastomosans,** (Ach.) Nyl. Thallus thin, white. Apoth. minute, crowded, difform, somewhat branched, subconfluent, plane, appressed. Spores in a Swiss specimen sent by Lojka under this name, oblong ovoid, muriform, .018–22 by .009 mm.—*A. astroidea var. Ach. L. U. p.* 146. *Nyl. Scand., p.* 259, (*non Expos. N. Caled., p.* 51.) *Stitz. Helv., n.* 1096. *A. Beltraminianum Mass. Mem., p.* 115, *Kbr. Pg., p.* 260, *fide Almq., p.* 8.—Europe.

Almq., p. 8, separates this, *A. montellicum*, *A. Ruana*, *A. rosacea*, *A. melanospila*, and *A. obscura Pers.* (*gyrosa Ach.*) as a subgenus, DERMATINA, distinguished by the chemical reaction and elliptical or subpyriform thekes, and in many respects resembling MYCOPORUM.

320. **A. abnormis,** (Ach.) Nyl. Thallus thin, white, determinate. Apoth. thin, nebulose-difform, or somewhat interrupted, irregularly angulose and obsoletely stellate. Spores oblong, muriform, the transverse cells 8–10, the longitudinal 2–4, .017–23 by .008–11 mm. Reaction from blue, violet; of the spores yellow.—*Opegrapha Ach. L. U., p.* 259, *Nyl. Syn. N. Caled., p.* 64, *Mull. Arg. Graph. Fée. p.* 60. *A. anastomosans Ach. Nyl. Expos. N. Caled., p.* 51, *fide seipso in Pr. N. Gr., p.* 104.—Tropical, New Caledonia.

321. **A. tædiosa,** Nyl. Thallus thin, white, limited by a black line. Apoth. erumpent, irregularly linear, inflexed and heaped, few branched, often thinly white-pruinose, within pale. Spores ovoid, muriform, the transverse series numerous, the longitudinal 5–6, .027–35 by .011–15 mm. Reaction vinous red.—*Chil., p.* 171, *Pr. N. Gr., p.* 136, 572. *A. lirellans Almq., p.* 40, *fide Nyl. Flora* 1885, *p.* 449. *Exs. Lojka Univ., n.* 144, which represents a form very common in New Bedford on red maple. The spores are mostly colorless, but Nyl. has referred here also a plant with smaller, oblong-ovoid, at length colored spores, .018–28 by .009–13 mm., now much resembling *A. radiata*, which occurs in New England and also in Florida in hb. Tuck. But the lichen also occurs on white pine, New Bedford, not differing, apparently, from that on red maple, with the spores only .022–28 by .009–13 mm.—A widely distributed plant, occurring in Chili, New Grenada, Europe, and in the United States from New England to Florida, in Illinois, and probably elsewhere.

322. **A. albovirescens,** Nyl. Thallus white or greenish-white, somewhat leprous, effuse. Apoth. punctiform, convex, within pale. Spores ellipsoid, muriform, the transverse cells 6–10, the longitudinal about 4, .010–22 by .009–10 mm. Reaction fulvous red.—*Torrey Bulletin* 1889, *p.* 105, *and Lich. Ins. Guineens. p.* 51.—Florida in hb. Eckfeldt. Compared l. c. to *A. abnormis*, but closely resembling *A. tædiosa*.

323. **A. phlyctiformis,** Nyl. Thallus thin, white. Apoth. small, irregular, simple, appressed. Spores muriform, .018–29 by .008–10 mm. Reaction from blue vinous red.—*Coll. Gall. merid.*, *p.* 14, *Arth.*, *p.* 93, *Pr. Gall.*, *p.* 166.—France.

324. **A. phæobæa,** Norm. Thallus from reddish ashy brown, contiguous. Apoth. minute, orbicular, convex, the hypothecium dark. Spores 4–6 locular, (in the American specimens referred by Nyl. to *A. paralia*, now submuriform,) .020–33 by .007–9 mm. Reaction vinous red.—*Flora* 1869, *p.* 525, *Almq.*, *p.* 47. *A. paralia Nyl. Flora* 1877, *p.* 565, *fide Almq.*—Maritime rocks, Europe, and on the same, coast of Maine, and island of Grand Manan.—*A. paralia* Nyl. is described as having a brownish ash colored, continuous, rimose thallus, the apoth. brown, rounded, plane, within pale. Spores ovoid, 4–5 locular, .018–22 by .007 mm. Reaction vinous red.—The European plant, according to Almq., grows intermixed with *Verrucaria ceuthocarpa*, and Th. Fr. in Scand., p. 343, considers it as parasitic upon that. But the thallus of the American plant is pure, although the gonidia are the common greenish-yellow ones, (haplogonidia Nyl.)

325. **A. macrotheca,** Fée. Thallus white, thickish, effuse. Apoth. rounded-angulate, now confluent, bordered by a spurious thalloid margin, depressed, plane, the hypothecium pale. Spores ellipsoid, muriform, .045–65 by .016–26 mm. Reaction vinous red. —*Suppl.*, *p.* 42, *and t.* 40, *f.* 18, *Nyl. Pr. N. Gr.*, *p.* 104, *Mull. Arg. Graph. Fée. p.* 60. *A. rugosa Fée Ess.*, *p.* 56, *Suppl.*, *p.* 41, *and t.* 40, *f.* 16, *fide Nyl. l. c. Exs. Wright Cub.*, *n.* 144*e*, 148, 149.—Tropical.

326. **A. mesoleuca,** Nyl. Similar to the preceding, but the apoth. white pruinose. Spores .035–50 by .016–22 mm., often brown.—*Pr. N. Gr.*, *p.* 104, *Mull. Arg. Graph. Fée. p.* 61. *Exs. Wright Cub.*, *n.* 257, in hb. Tuck.—Tropical.

327. **A. ambignella,** Nyl. Thallus thin, white, sprinkled with minute soredia. Apoth. roundish or oblong-difform, minute, depressed. Spores oblong, irregularly 4–6 locular, one or two of the cells divided, .023–26 by .008 mm. Reaction none.—*Pr. N. Gr.*, *p.* 103. *Exs. Lindig*, *n.* 827, 2809.—New Grenada. Spores figured in edit. 1, *t.* 2, *f.* 48.

328. **A. intervenients,** Nyl. Thallus ash-colored, indeterminate. Apoth. brownish-black or black, rounded or rounded-oblong, slightly difform, plane, two or three sometimes contiguous, within of the same color. Spores 6–8 locular, the cells 2–3 times divided, brown or decolorate, .022–29 by .008–10 mm. Reaction vinous red.—*Pr. N. Gr.*, *p.* 104.—Florida and Texas in hb. Tuck.

329. **A. adveniens,** Nyl. Similar to the preceding, but the spores only 5–6 locular, the cells once or twice divided, .022–25 by .007–11 mm. Reaction vinous red.—*Syn. N. Cald., p.* 63.—New Caledonia.

330. **A. ampliata,** Kn. and Mitt. Thallus white or ash-colored, thin, often rimose, determinate. Apoth. roundish or oblong, plane, sometimes partly suffused with the thallus, within dark. Spores ovoid-oblong, at length brown, 6–8 locular, the upper cell larger, the cells 2–4 times divided, .016–42 by .010–15 mm. Reaction vinous red.—*Kn. and Mitt. N. Zeal., p.* 106, *and t.* 12, *f.* 33. *Nyl. N. Zeal.* (1888.) *p.* 122, *and f.* 6.—New Zealand.—Allied to *A. interveniens.*

331. **A. Hallii,** Tuck. Thallus whitish ash-colored, bordered by a dark line. Apoth. numerous, small, appressed, rounded or irregular, now somewhat confluent, plane. Spores oblong-ovoid or fusiform-oblong, 7–10 locular, some of the cells now once divided, .019–35 by .007–9 mm. Reaction vinous red.—Illinois, (E. Hall,) in hb. Tuck.

332. **A. spilomatoides,** Nyl. Thallus white, determinate, uneven, areolate, softish, the surface almost mealy. Apoth. innate, difform, plane. Spores ellipsoid, brown or decolorate, 7 locular, some of the cells divided, .016–18 mm. long. Reaction of the hymenium blue, of the thekes vinous red.—*Chil., p.* 169, *Arth., p.* 94. —On maritime granitic rocks, Chili.

333. **A. obtusula,** Nyl. Thallus thin, white, rimose. Apoth. superficial, suboblong, somewhat suffused. Spores turgidly ellipsoid, thicker above, 4 locular, the upper cell occupying nearly half the spore, with one or two longitudinal septæ, .021–24 by .011–13 mm. Reaction fulvous red.—*N. Zeal.* (1888,) *p.* 123.—New Zealand.

334. **A. bessalis,** Nyl. Thallus white, limited by a black line. Apoth. black or brownish-black, plane, oblong or rounded-difform, innate, within dark. Spores oblong-ovoid, brown, the upper cell occupying one-third the spore entire, the lower one occupying the remainder, muriform divided, .036–44 by .015–16 mm. Reaction vinous red.—*Ins. Andam., p.* 15.—Andaman Islands.

335. **A. fusco-nigra,** Nyl. Description not seen. Under the description of the preceding, which is said to be akin to this, the spores are said to be .025–28 by .011–13 mm. A plant by this name in hb. Tuck. has small, rounded or somewhat angulose apoth. Spores broadly and obtusely oblong-ovoid, the upper third of one entire cell, the remainder of about 6 cells, longitudinally about 4 locular, .036–40 by .018 mm.—*Fn., f.* 133, *Exot., p.* 245.—Tahiti.

336. **A. nucis,** Müll. Arg. Similar to *A. conferta*, but the thallus greyish-brown, and the apoth. black and somewhat stouter, within dark. Spores muriform, the transverse cells 12, the longitudinal 4–5, .025–35 by .012–15 mm.—*Graph. Fée. p.* 60.—*A. polymorpha v. substellata Fée Ess., p.* 53, *Suppl., p.* 38.—Tropical.

337. **A. nebulosa,** Müll. Arg. Thallus thin, white, nebulose, about one inch in diameter. Apoth. numerous, angulose-orbicular, or at length short radiate and irregularly few lobed, plane, slightly rugulose, within dark. Spores muriform, the transverse series 8, the longitudinal 2–3, .018 by .007–8 mm.—*Beitr., n.* 221.—Caracas, S. America.—Near *A. abnormis* and *A. tædiosa*.

338. **A. consanguinea,** Müll. Arg. Thallus thin, white, effuse. Apoth. oblong-difform or angulose-orbicular, plano-convex, within pale. Spores ellipsoid, 6 locular, the cells 1–3 times divided, .017–19 by .007–8 mm.—*Beitr., n.* 1377.—Cape of Good Hope.—Akin to *A. atro-rufa*.

339. **A. emersa,** Müll. Arg. Thallus thin, white, effuse, somewhat mealy. Apoth. orbicular or oblong, depressed-convex. Spores ovoid-fusiform, 6 locular, the cells now once divided, .015–17 by .007–9 mm.—*Socotr., p.* 13.—Socotra, Africa.

340. **A. obvelata,** Müll. Arg. Thallus thin, white, at length mealy. Apoth. angulose-orbicular or somewhat rugulose, convex, now confluent, suffused with the thallus, within greenish, the hypothecium pale. Spores ovoid, 12 locular, the intermediate cells 2–3 times divided, .028–35 by .013–15 mm.—*Beitr., n.* 1098.—Australia.

341. **A. albida,** Müll. Arg. Thallus white or greyish-white, at length somewhat mealy. Apoth. angulose-oblong, curved and irregular, or short-bifurcate, slightly prominent, the hypothecium dark. Spores oblong-ovoid, 6 locular, the intermediate cells 2–3 times divided, .028 by .012 mm.—*Beitr., n.* 1097. *Exs. Lojka Univ., n.* 243.—Australia.

342. **A. xylographoides,** Müll. Arg. Thallus inconspicuous. Apoth. emergent, linear, acuminate, simple or 2 branched, obsoletely rimæform, within pale. Spores obovoid, 4–6 locular, the intermediate cells once divided, .012–15 by .0065–7 mm.—*Palest., p.* 7.—Palestine.

343. **A. phyllogena,** Müll. Arg. Thallus thin, white, somewhat indistinct. Apoth. orbicular, slightly convex, somewhat rugulose, the hypothecium olive-black. Spores 1, oblong-ellipsoid, muriform, the transverse cells 18–20, the longitudinal 5–6, .070 by .023 mm.—*Beitr., n.* 308.—On leaves, Brazil.—Akin to this is *Wright Cub., n.* 196, on leaves, the spores 1, muriform-multilocular, brown, .034–66 by .014–16 mm.

344. **A. subilicina,** Leight. Thallus ash-colored, bordered by a dark line. Apoth. rounded and variously difform, depressed-convex, bordered by a thin, white, mealy margin. Spores linear-obovate, muriform, at length brown, the extreme cells larger.—*Ceylon, p.* 181, *and t.* 36, *f.* 28.—Ceylon.

345. **A. cinerascens,** Kph. Thallus white or pale ash-colored, powdery, bordered by a black line. Apoth. emergent, scattered, rounded, oblong-difform, elliptical, angulose, and polymorphous, here and there concave, scabrous, now obsoletely bordered by a thalloid margin. Spores 1–2, muriform, .046–48 by .019–22 mm.—*Flora* 1876, *p.* 482.—Brazil.

346. **A. picila,** Mass. Thallus glaucescent, effuse, bordered by a dark line. Apoth. macular-difform, erumpent, numerous, scabrous. Spores ovoid, or oblong-ovoid, muriform, the upper cell much larger, .033–36 by .020–22 mm.—*Kph. Amboin., p.* 8.—Amboina, Africa.

347. **A. oasis,** Mass. Thallus thin, white, bordered by a black line. Apoth. innate-sessile, minute, macular-difform. Spores oblong-ovoid, muriform, brown.—*Kph. Amboin., p.* 8.—Amboina.

348. **A. cinereo-argentata,** Kn. Thallus thin, smooth, shining, glaucous, continuous, subdeterminate. Apoth. numerous, innate, lirellate, indistinctly stellate or difform. Spores 4 locular, or the two terminal cells again unevenly divided, linear, constricted, the ends acute, .050–60 by .006–7 mm.—*Shirley* 1889, *p.* 150.—Australia.

Of the following, belonging to this section, the descriptions have not been seen:

A. albata, *Nyl. Arth., p.* 93 (*nomen.*) Peru.
A. Beccarianum, *Beltr. Giorn. Soc. Bot. Ital.* 1875, *p.* 202.—Italy.
A. hysterellum, *Mass. Catagr., p.* 654.—Brazil.
A. melanospila, *Anz. Symb.* 1868, *p.* 21.—Italy.
A. rosacea, *Anz. Long. exs., n.* 435.—Italy.
A. violascens, *Fl. Lich. Capens., p.* 23.—Cape of Good Hope.

The following are to be excluded from Arthonia:

A. cæsio-pruinosa, *Fée Suppl., p.* 36 = Graphis *fide Mull. Arg. Graph. Fée. p.* 49.
A. cembrina, *Anz. Long., n.* 207, *and Rab. L. E., n.* 726, so far as my specimens show, is a Pyrenula.
A. ceracea, *Fée Ess., p.* 50, *and* **A. Jobstiana,** *Fée Suppl., p.* 37 = Graphis scalpturata, *fide Mull. Arg. l. c., p.* 49.
A. confluens, *Fée Ess., p.* 55 = Graphis confluens *Fée* (*non Nyl.*) and Lecanactis Féeana, *fide Mull. Arg. l. c., p.* 45.

A. confluens, Hepp. in *Kbr. Pg. p.* 265 = Opegrapha atra var. trifurcata (Hepp.) fide Stitz. Conspect.. p. 5.

A. divergens, *Fée Ess. p.* 53; **A. sulphurea,** *ibid. p.* 51; and **A. sinesigrapha,** ibid. p. 50 = Graphis dendritica, *fide Mull. Arg. l. c., p.* 24. The last is Gr. serogrupta, *fide Kph. Flora* 1876, *p.* 415.

Arthothelium Flotovianum, *Kpr. Pg. p.* 261 = Mycoporum elabens *fide seipso and Zw. Heid., p.* 79.

A. fusco-cinerea, *Zw. Exs., n.* 311, *Kbr. Pg.*, 261 = Mycoporum sp. *fide Zw. l. c.*; and **A. Lahmianum,** *Kbr. Pg.. p.* 263, is the same, *fide Almq., p.* 37.

A. gelatinosa, *Chev. Jour. Phys.* 1822, p. 543 = Melanotheca *fide Nyl. En., p.* 145, *Pyrenocarp., p.* 70. Athrismidium Trev. *fide Kph. Gesch. III, p.* 114.

A gibbernlosa, Ach. *L. U.. p.* 142. (A. astroidea v. Swarziana *Nyl. Scand., p.* 259) = Melaspilea deformis fide *Anz. Cat. Sondr., p.* 94, *Stitz. Helv., n.* 1117, *Zw. Heid., n.* 480. "A. gibberulosa" of. Muhlenberg's catalogue has not been identified.

A. glomerulosa, Fée *Ess. p.* 54, and **A. granulosa,** ibid, p. 52 = Trypethelium mastoideum, fide *Mull. Arg. l. c., p.* 70, 71.

A. glyphsoides, Fée *Ess., p.* 56 = Chiodecton depressum *fide Mull. Arg. l. c., p.* 66.

A. granulosa, Græw. *Bot. Not.* 1863, *p.* 10 = Opegrapha sp. *fide Almq., p.* 66.

A. graphidis, Fée. *Suppl., p.* 58 (**A. polymorpha,** *ibid Ess., p.* 53, excl. varr.) = Melaspilea *fide Mull. Arg. l. c., p.* 21.

A. gregaria, Fée, *Ess., p.* 50 = Sarcographa inquinans Fée *Suppl., p.* 45, *fide* Müll. Arg. l. c., p. 64.

A. lecanorella, Wain. *Medd. Flor. Fenn.* II p. 70 = Lecidea sp. *fide Almq., p.* 66.

A. lecanoroides, Fée *Ess., p.* 54 = Platygrapha *fide Nyl. Pr. N. Gr., p.* 93.

A. leucocheila, Fée *Ess., p.* 52 = Graphis *fide Nyl. l. c., p.* 79.

A. lobulata, Kn. and Mitt. *N. Zeal., p.* 104 = Melaspilea *fide Nyl. N. Zeal.* 1888, *p.* 124.

A. marginata, Chev. *Jour. Phys.* 1822, *p.* 52 = Graphis Lyelii *fide Nyl. Pr. Gall., p.* 151.

A. marginata, Fée *Ess., p.* 51 = Gr. scalpturata *fide Nyl. Pr. N. Gr. p.* 79 = G. cæsiopruinosa *fide Mull. Arg. l. c., p.* 49.

A. marginata, Duf. *Jour. Phys.* 1818, *p.* 205 = Gr. Lyelii *fide Kph. Gesch. II, p.* 555.

A. moriformis, Ach. Syn., p. 5 = Biatora fide *Th. Fr. Scand. II, p.* 401.

A. obtrita, Fée *Ess., p.* 51, and **A. obtusa,** *ibid Suppl., p.* 40 = Gr. cæsiopruinosa *fide Mull. Arg. l. c., p.* 49.

A. obtusangula, Chev. *Jour. Phys.* 1822, *p.* 52 = Gr. dendritica *fide Nyl. Pr. Gall. p.* 150.

A. patellula, Fée *Ess.*, *p.* 43 = Gr. patellula *fide Mull. Arg. l. c.*, *p.* 24 = Gr. separanda *fide Nyl. Pr. N. Gr.*, *p.* 565.

A. perangusta, Stirt. *N. Zeal.*, *p.* 40 = Xylographa *fide Bot. Jahrber.* 1875, *p.* 106.

A. proximella, Nyl. Scand., p. 262 = Melaspilea fide Almq., p. 66, *Wain. Adjum. II*, *p.* 154, *Arn. Tir.*, *p.* 143.

A. sphærula, Ach. *Syn.*, *p.* 5 = nil rite formatum, *fide Nyl. Pr. Gall.*, *p.* 196.

A. subcembrina, Anz. Symb. 1864, p. 32 = Cyrtidula sp. *fide Minks Beitr. I*, *p.* 36.

A. tumidula, Leight. *Note on Richardson's Exp.*, *p.* 200 = Mycoporum pycnocarpum *fide Kph. Gesch. II*, *p.* 650.

Coniocarpon nigrum DC. *Fl. Fr. II*, *p.* 324, is an older name of *Spiloma melaleucum* Ach. *Syn.*, *p.* 2, *fide Almq.*, *p.* 28, but cannot be determined from the specimens destitute of a hymenium in hb. DC.—France.

On page 54, n. 328, *read* **interveniens.**

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